



FRIDAY, DECEMBER 22, 1876.

Steel Tired Car Wheels.

In this number of the *Railroad Gazette* we give engravings of a number of wheels with steel tires showing the different methods employed in Europe for fastening the tires. The engravings on this page are copied from *Engineering*, and are examples of late forms of wheels designed in England. On another page will be found some illustrations of German practice as exhibited by Krupp at the Centennial Exhibition.

The engraving, fig. 1, which is copied from *Engineering*, represents a wheel patented by Mr. William H. Kitson, manufactured by the Leeds Wheel & Axle Company. It is described by our contemporary as follows:

"The chief feature of the wheel is the provision of a central flange or disc, which extends from the boss nearly to the tire, and which is traversed by the bolts securing the Mansell rings. This central disc is either forged in one piece with the boss, as shown in our section, or if a cast-iron boss is used it is made of wrought-iron plate, and the boss is cast on it. In either case, the makers have, by means of special arrangements, succeeded in making a thoroughly satisfactory job. When the iron disc is placed at the centre, as shown in the section, the wood segments or 'tabs' are made half the usual thickness, the sets being disposed on each side of the iron disc. In another form of the wheel designed by Mr. Kitson, however, the iron disc is on one side instead of at the centre, and wooden tabs of the usual thickness are employed. The new wheel possesses several important advantages, and is, we think, likely to come into very extensive use, particularly with the increasing employment of continuous brakes, as the iron disc, traversed as it is by the ring bolts, serves to transmit all torsional strains from the tire to the axle, and thus entirely relieves the wooden discs of such strains as they are least fitted to bear. Already a number of these wheels are in use, and many more are in process of construction.

"Figs. 2 and 3 represent a form of disc railway wheel designed and patented by Mr. James B. Handyside, of the Crown Iron Works, Glasgow, this wheel possessing several features which appear well deserving of attention. The construction of the wheels is, as will be seen, very simple, and offers special facilities for manufacture. Each wheel consists of the tire, the boss, two discs, two rings, and twelve bolts, and all these parts can readily be made strictly to gauge so as to be interchangeable.

"The boss is of wrought iron and has forged in one piece with it four arms, these arms being of such length that they may be each traversed by one of the bolts which fasten the discs together. The discs are of thin plate steel and are stamped so as to give them the corrugated form shown, their shape being such that at their outer and inner peripheries they grip the tire and boss respectively. It will be noticed from our section that the tire does not bear upon the outer edge of the discs, the latter so gripping the tire that the boss is suspended, and the discs are thus subjected to a radial tension and not compression.

"Outside the discs at the point where the latter most nearly approach each other a pair of rings are placed, these rings being traversed by the twelve bolts already mentioned. These bolts bind the discs together, while four of them also pass through the arms of the boss, as shown. The points of the bolts are riveted over, and were informed by Mr. Handyside that the experience gained with the wheels already running tends to show that the nuts have no tendency whatever to work loose.

"Several pairs of these wheels were set to work more than six years ago on the Caledonian Railway, and they have continued to run most satisfactorily up to the present time. Other similar wheels are now being made for that line, while they have been specified for a number of cattle wagons which the company is now giving out. Sets of the wheels have also been ordered for the Highland Railway as well as for the Great Eastern, the London, Chatham & Dover, and the Isle of Wight railways, so that in a short time there will be quite a number of Mr. Handyside's wheels running.

"It will be evident from our engravings that the form of the discs gives to the wheel a certain amount of elasticity which is conducive to the durability of the tire, while the connection between the boss and tire is such that the former may safely be worn down very thin before being renewed. The wheels also possess very great lateral strength, and we have now before us the results of some experiments carried out by Mr. Krupp at Essen, in which Mr. Handyside's wheel was laid on its side on supports bearing against the tire, and tested by a weight of 397 lbs. let fall from various heights of from 3 ft. to 23 ft., these trials showing the wheel to possess remarkable endurance."

THE UNITED STATES INTERNATIONAL EXHIBITION.

XX.

GERMAN DEPARTMENT.

One of the greatest deficiencies of the Exhibition during the first half of the time it was open, and, in fact, in many cases,

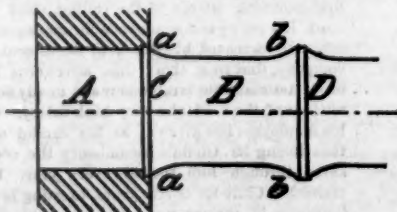


Fig. 4.

still later, was the want of full and clear printed descriptions of the various exhibits. It was only during the last weeks or

months of the Centennial that exhibitors seemed to realize the importance of having information prepared in this form for distribution among those who were specially interested in the articles exhibited. This was especially noticeable in the German department in Machinery Hall. It was, in fact, not completed until a month or two after the opening, and after that time repeated efforts failed to elicit any information from the Teutonic sphinxes in charge of it. Just before the close, how-



Fig. 1.

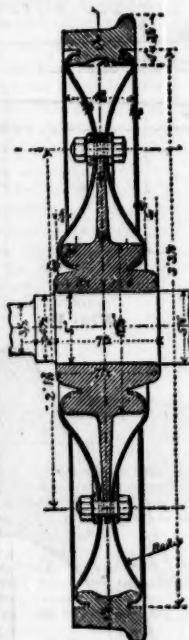


Fig. 2.

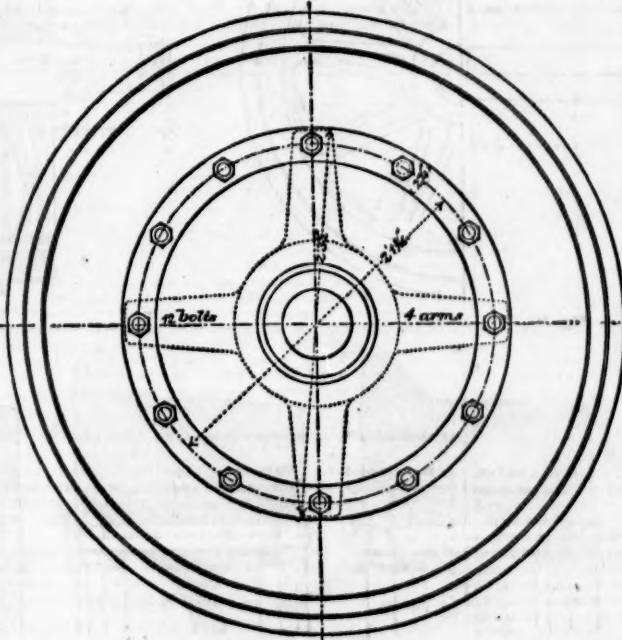


Fig. 3.

ever, very excellent catalogues were prepared, and a full description and an album of illustrations of the admirable display from Krupp's great works were obtainable by application to the proper parties. In describing this exhibit, probably it cannot be done in any better way than to quote from this catalogue, and add whatever comments seem to be required between the paragraphs. The objects intended for use on railroads exhibited by Krupp are described as follows in the catalogue:

"One locomotive straight axle of crucible cast steel in the forged state. (Pattern of North Eastern Railway in Switzerland.)

"One forged tender axle of crucible cast steel (pattern of the same railway). The body of this axle is forged complete under the hammer, and requires no further workmanship.

"One car axle of crucible cast steel forged according to the dimensions approved by the German railways. The body is in the same manner forged complete under the hammer."

This is the axle illustrated in the *Railroad Gazette* of Nov. 10 of this year. Its weight is 200 kilogrammes = 440.9 lbs., or 100 lbs. more than the Master Car-Builders' standard, to which so much objection has been made on account of its weight.

"Two piston rods forged from crucible cast steel.

"One coupling rod forged from crucible cast steel."

These rods, and in fact all that were exhibited in the German department, were forged with solid ends and oil boxes. This seems to be the almost universal practice in Europe, especially with coupling rods.

"Two slide bars forged from crucible cast steel.

"One piston forged from crucible cast steel.

"One axle box for locomotives.

"One 'crank-piece,' or crank pin boss with two spokes for locomotive wheels, and one with three spokes.

"These objects have been made of wrought iron and forged under a Haswell hydraulic press of 800 tons pressing power." [Further description of this method of forging will be given hereafter.]

"Four tires of crucible cast steel in the rolled state, viz.: one of 56 in. inside diameter, one of 18 in. and one of 26 in., the two last being intended for paper car wheels used in Austria.

"One tire of crucible cast steel, turned and bored of 94 in. inside diameter," (and 2 in. thick so that its outside diameter was 8 ft. 2 in. diameter—a size entirely unknown in this country.)

"These tires have been forged from solid blocks of crucible cast steel by making a cut in the middle and driving them out under a hammer. Then the tires have been rolled to the different diameters and sections. Up to the year 1853 only wrought-iron and fine-grain tires were used. The establishment of Krupp was the first to introduce solid cast-steel tires for railway purposes, and these have since become of ordinary and extensive use.

"One car axle of crucible cast steel in the finished state, according to the dimensions approved by the German railways.

"One locomotive leading axle of crucible cast steel in the finished state (pattern of the North Eastern Railway in Switzerland).

"One locomotive crank axle of crucible cast steel in the finished state with double bearings.

"One locomotive eccentric crank and one driving-wheel crank, both of crucible cast steel in the finished state.

"One locomotive driving-axle of crucible cast steel ready fitted with tires, cranks of same material, spoke wheels, nave and counter-weights included, of wrought iron."

This form of construction is much used on the continent of Europe. The engines in some cases have double frames with two bearings on the axle, one inside and the other outside the wheels. In others the frames and axle bearings are single, but outside the wheels, and the crank-pins attached to cranks on the ends of the axles. The axle last described has small cranks on the end of the crank-pin by which the valve gear is worked. The form of the bearings on the axles shown in fig. 4 is also noticeable.

In this the wheel-seat A is considerably larger in diameter than the journal-bearing B, and the latter is made with collars, C, C, at each end. The journal-bearing is united with the collar by fillets, a and b, described with long radii, so that the corners are much less abrupt than they are usually made.

"Two wheels of wrought iron, the one in the forged, the other in the finished state. These wheels are made by coiling a wrought-iron band of different widths, the one width forming the nave, the other the disc and the last the rim of the wheel. The coil is then welded together. This method of making wheels is patented by the firm of Fried. Krupp in the United States and Canada."

Fig. 5 shows a section of part of one of the coils from which these wheels are made, and fig. 6 a section of the wheel when the coil is welded up. The band from which the wheels are made is widest at one end. When this is coiled up it forms the hub. It then becomes narrower, and when coiled around the hub it forms the plate or disc of the wheel, and at the other end is wide enough to form the rim.

"One tender axle of crucible cast steel, body forged, ready fitted with tires of same material and spoke wheels, nave included, of wrought iron.

"One car axle (fig. 7) of crucible cast steel, body forged, ready fitted with tires of same material and spoke wheels, nave included, of wrought iron. (An enlarged section of the tire and its fastenings is shown in fig. 11.)

"One car axle of crucible cast steel (fig. 8), ready fitted with disc wheels cast in moulds of same material. A piece annexed cut off from such disc wheel showed the solid and sound casting.

"One car axle of crucible cast steel, ready fitted with tires of same material. The wheels of the Handyside pattern illustrated on another page (figs. 2 and 3) being constructed of pressed plates of crucible cast steel, nave, hoops, bolts and screws of wrought iron. This class of wheels, besides great elasticity, have the advantage that the tire is fastened on its whole circumference and that it cannot become loose even in case of breakage. Trials made have given very favorable results. The construction of these wheels has also been patented in the United States and in Canada by the firm of Fried. Krupp."

The other engravings of wheels, figs. 9 and 10, represent other forms manufactured by Krupp, and figs. 11, 12, 13, 14 and

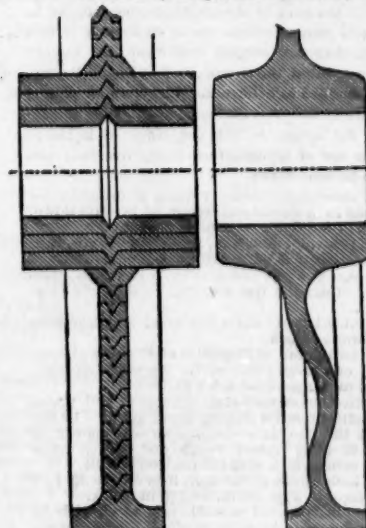


Fig. 5.

Fig. 6.

15 show different methods of fastening tires which are illustrated in the album already referred to. These plans are

worthy of careful study at the present time, when attention is being directed to the employment of steel-tired wheels in this country.

"A collection of fractures of spring steel and of sections of spring-steel bars. The spring steel is supplied in bars of any section not below one-fifth of an inch thick and one inch wide.

"A collection of cast-steel springs for locomotives, tenders and cars."

A very noticeable feature in the springs for passenger cars was their very great length, some of them, shown in fig. 16,

"A series of various classes of ores, pig iron and pig steel; iron from the mines and blast furnaces of the firm, used in the manufacture of steel."

The "artillery material," as it is called, exhibited by this firm will not be described here.

The Late E. P. Gould.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the death of Mr. E. P. Gould, which occurred on Thursday, Nov. 23, at Paterson, N. J., the railroad interest in this

country, but more especially that in South America, lost one of its most earnest and faithful promoters. Mr. Gould at the time of his death occupied the position of Assistant Superintendent at the Rogers Locomotive Works at Paterson, but his claim to popularity among railroad men grew out of his long and fruitful, not to say eventful life in Chili and Peru, where he passed some fifteen years in various responsible positions as manager and superintendent of new railroads. He served his apprenticeship under the then firm

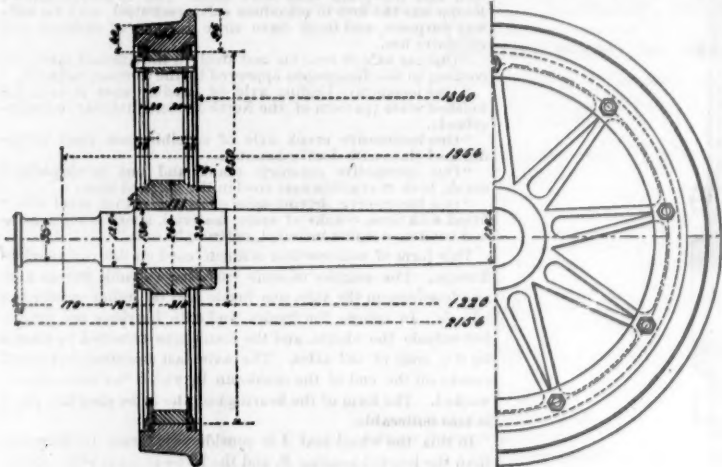


Fig. 7.

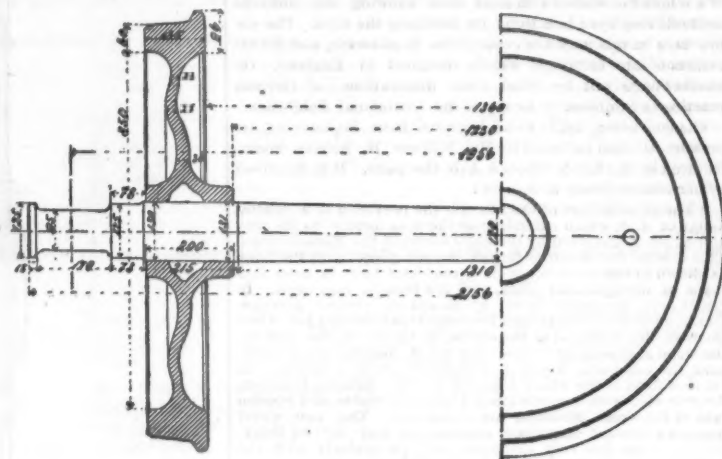


Fig. 8.

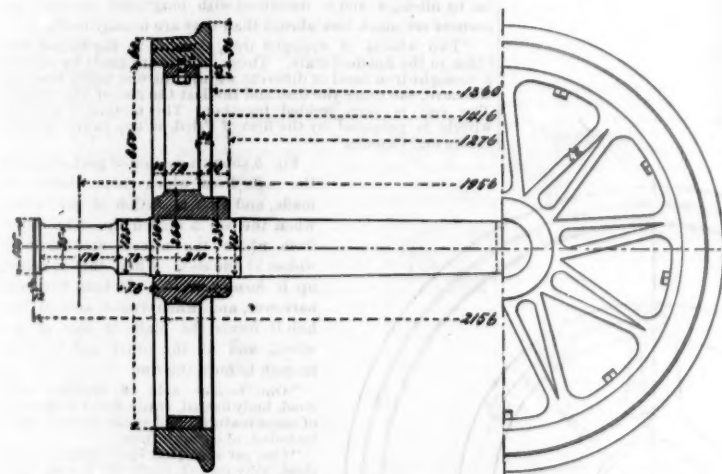


Fig. 9.

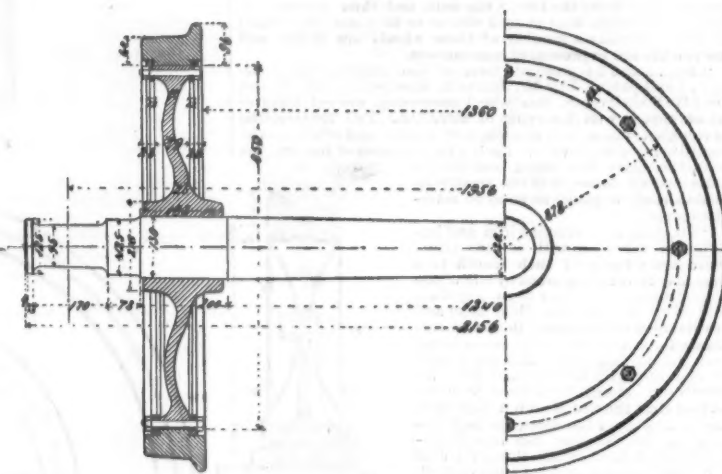


Fig. 10.

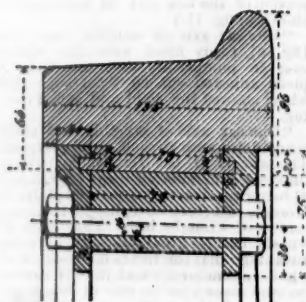


Fig. 11.

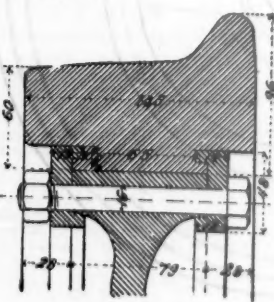


Fig. 12.

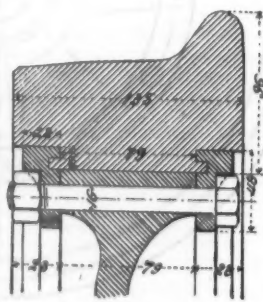


Fig. 13.

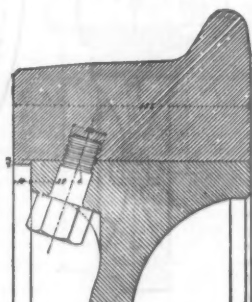


Fig. 14.

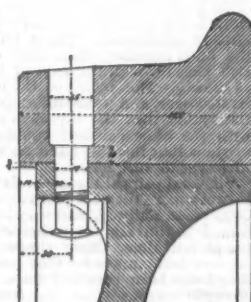


Fig. 15.

being 71 1/2 in. long. It will also be noticed in the inverted plates of the springs that instead of chamfering off the ends of the spring plates, similar to the chisel cutting edge, as is customary in this country, they are shaped somewhat like a spear point, or pointed the reverse way to a chisel edge. We are inclined to believe that the German plan is theoretically the most correct, but probably the action of the spring is not very different in either case, the cost of manufacture being the chief element to be considered.

"One reversible double crossing of crucible cast steel, cast in a mould and ready to be laid down. (Pattern of the Cologne-Minden Railway).

"One Bessemer steel rail, 55 feet in length, bent four times. Section of the Ribinsk-Bologie Railway of Russia. The one end of the rail shows the fracture, the other end the section. Weight, 57.8 lbs. per yard.

"A collection of Bessemer steel rail fractures of different sections.

"One switch rail of Bessemer steel ready planed, the one end forged out to the Vignolles section. (Pattern of the Berlin-Stettin Railway).

"A collection of cast-steel wheels forged under a hydraulic press for mining cars, adopted by the mines in the Rhenish-Westphalian coal district on account of their lighter weight and greater resistance in comparison with chilled iron wheels.

"One boiler plate of wrought iron cut to 23 ft. 6 in. length, 6 ft. 2 in. width, and 3/8 in. thick.

"One boiler plate of crucible cast steel, with its edges untrimmed. Greatest length 29 ft. 11 in., width 5 ft. 6 in., thickness 3/8 in.

"A collection of fractures of hardened tool and file steel, as well as various other fractures of manufactured articles, such as axles, tires, crossings, disc wheels, piston rods, etc.

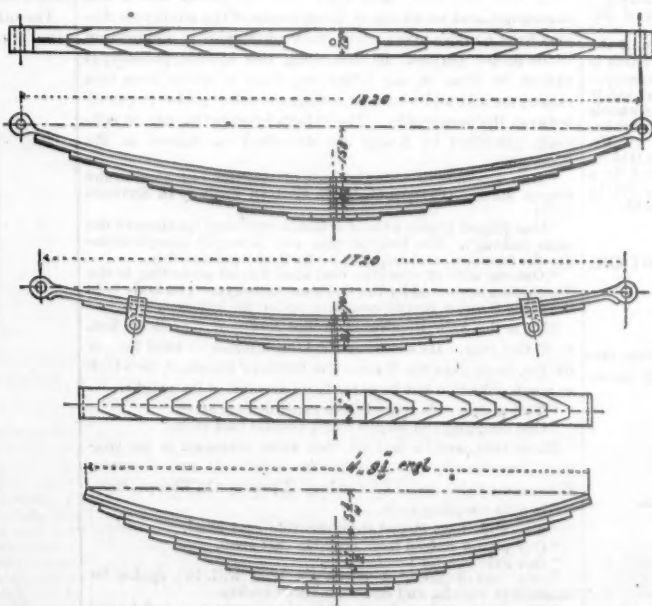


Fig. 16.

The dimensions given above are millimetres.

of Rogers, Ketchum, Grosvenor & Co., at Paterson; remained with them as a journeyman mechanic for four years, or till the year 1847, when manifesting considerable tact and ability as a skillful engineer, he was made locomotive engineer on the Troy & Greenbush Railroad; after but six months of service in this capacity he was elevated to the position of Master Mechanic of the road at the age of 28 years. In 1851 he took charge of the Hudson River Railroad, and is well remembered as having run the first locomotive over it. In 1852 he became head Superintendent. Six months later he joined the company (Breece, Kneeland & Co.) then having control of the New Jersey Locomotive Works at Jersey City. Four years passed, and the crisis of '57 came, and with it the complete prostration of business. He then first began his career in South America on the Caldera & Copiapo Railroad, Chili, first assuming charge of the rolling stock of the road. His policy and commendable management of affairs so increased his worth in the esteem of the company, that in a short time afterwards he was made Assistant Superintendent and finally Superintendent of the road at a very high salary. One of his employees has given it as his candid opinion that during Mr. Gould's incumbency the company saved through him \$200,000 every year. He remained in Chili for twelve years, exerting his large influence in various ways toward opening up a complete system of railroads all along western South America, and more than all, procuring thousands of dollars worth of work annually for the

locomotive and machine business at the North. It was he indeed who first introduced locomotives from the Rogers Works at the South and gave this and other companies such a firmly-established trade in that vast country. In 1869 Mr. Gould was about to return home, having abandoned his position in Chili; when on his way, happening to stop in Peru, he accepted at an increased salary an engagement as Superintendent of Motive Power on the Mollendo & Arequipa Railroad, built by the wealthy railroad contractor, Henry Meiggs. While here he received a massive silver medal, appropriately inscribed, from President Balta, Chief Magistrate of the Republic, as a memento of his worth as a railroad official. He returned home in 1872, when he was made Assistant Superintendent of the Rogers Works. He was next engaged by this company to represent their interests at Cuba, and made one of the most successful of business trips, procuring a large number of orders for locomotives for several railroads. In August of 1875 he represented the same company at the International Exposition in Chili, returning in April, 1876. His health had latterly begun to fail very perceptibly from exposure in foreign climates, and at last his illness settled into Bright's disease of the kidneys, from which he came to a premature death.

Mr. Gould invented the new design for narrow-gauge locomotives that is now in use on many railroads along the west coast of South America. The first one built was "La Economista," which is still running on the Copiapo Railroad. As an able, efficient railroad engineer he had few superiors. Socially he was a man of steady habits, of strict integrity, kind, obliging, reserved—never obtrusive, had a ready wit and was greatly beloved by all with whom he came in close contact. In truth, it can be said of him, he died without an enemy.

A Note from Professor Winkler.

VIENNA, Austria, Oct. 30, 1876.

TO THE EDITOR OF THE RAILROAD GAZETTE

Will you be kind enough to allow me space in your paper for the following remarks, in order to indicate the reason why I do not give my answer to the attacks directed against me by Mr. Charles Bender, of New York.

From the works published by Mr. Bender I have found that he is a man of ability; but I am all the more sorry to see that, in almost all of his publications, he allows his passion to carry him off to such a degree that it seems impossible to arrive at a peaceable understanding with him. Some parts of what I have published he seems to misunderstand, probably on account of having read them superficially; but his pen seems to be guided principally by animosity against one who has dared to express doubts about his infallibility, and thereby severely wounded his pride.

I do by no means consider myself infallible, but Mr. Bender's attacks cannot affect me. Neither do I consider our European ways of construction so perfect as to be beyond improvement, as will appear also from the fact that, at the September meeting of the Society of German Engineers and Architects at Munich, I introduced a resolution to consider the expediency of introducing American principles of construction in Germany.

Friendly communications between your highly esteemed body of American engineers and those of the profession in Europe, as already in so many ways existing, will greatly help to clear the views and make the principles of construction more in the direction of perfection. But the method adopted by Mr. Bender is not the right one.

E. WINKLER.

ANNUAL REPORTS.

Erie.

The report is for the year ending with September, 1876. Comparisons are made with the previous year.

The mileage is reported as follows:

	1st	2d	Side	Third	Total
MAIN LINE:	Track.	Track.	Track.	Track.	Track.
Owned.....	429,144	286,195	163,662	*142,607	981,608
Leased.....	30,886	30,886	40,618		102,388
Tot. of Main Line	460,030	267,010	194,278	142,607	992,921
BRANCHES:					
Owned.....	96,548	7,918	29,993	82,506	176,712
Leased.....	389,498	30,186	112,548	148,589	570,821
Operated.....	39,709		18,725		58,434
Tot. of branches	495,755	38,104	161,266	231,095	816,073

The Main Line is that from Jersey City to Dunkirk, which is no longer the main line for most of the traffic of the road, which goes between Jersey City and Buffalo. Adding together main line and branches we have:

	1st	2d	Side	Third	Total
Owned.....	track.	track.	track.	track.	track.
Owned.....	525,592	344,043	183,653	225,113	1,069,945
Leased.....	390,383	61,071	153,166	148,589	673,519
Operated.....	39,709		18,725		58,434
Total.....	955,774	305,114	355,544	373,702	1,690,294
Total 1875.....	999,454	305,114	337,126	114,300	1,695,844

Thus, of the mileage worked by the company it owns 55 per cent. of the road and 59 per cent. of the track. The branches reported as "operated" and not owned or leased, are worked by us by temporary arrangement or with irregular rental. Compared with the result for the previous year, there is an increase on main line of 1,029 miles in first track, of 0.260 miles in second track, of 4.897 in side track and of 98.807 in third rail. Some of these small differences are due to a measurement of the track, which has shown that the line from Jersey City to Dunkirk, which has always been counted 459 miles long, is really a trifle more than 460 miles. The total track of main line is 55.59 miles longer this year.

The changes in the mileage of branches reported are an increase of 12,255 miles in first track, due to the addition of the 16½ miles of the Barclay Railroad to the branches, and to numerous corrections in the former reported lengths, due to the new measurement. Scarcely one of the 22 branches is reported exactly as before, and the differences amount in some short branches to more than two miles.

The second track of branches is reported 1,496 miles less than the previous year, the sidings 19,221 miles greater, the third rail 160,596, the total track 104,277 miles longer.

The total track of main line and branches is thus reported 159,867 miles, or nearly 10 per cent., greater at the end than at the beginning of the last fiscal year; corrections in the mileage made by the recent measurements indicate that the true increase is 164.45 miles.

*In the totals, half the length of third rail is counted as track. There is 55.78 miles of it on sidings, and 35.348 miles on the Jefferson Branch, leaving 283 miles between Susquehanna and Suspension Bridge.

The equipment is reported as follows:

Locomotives:	1875-76.	1874-75.
In good condition.....	200	239
In fair condition.....	216	194
In bad condition.....	52	28
Broken up.....	37	44
Total on books.....	505	505
First-class passenger cars.....	241	198
Second-class passenger cars.....	67	67
Baggage, mail and express cars.....	99	93
Freight cars.....	11,337	11,374

This shows an increase of seven in the stock of locomotives, which was in reality 461 at the beginning and 468 at the close of the year, those "broken up" simply representing the numbers of locomotives which the company once had. There is a considerable depreciation in the condition, 39 less being in "good" condition, and 24 more in "bad." The company's property in the securities of other companies (a very large amount) is not described in the report, which is the one made to the State Engineer and Surveyor.

The stock and debt at the close of the year were:

Capital stock.....	\$86,536,910 00
Funded debt.....	54,211,514 00
Floating debt.....	1,159,069 46

This is at the rate of \$164,618 of stock, \$103,237 of funded debt, and \$2,205 of floating debt per mile of road owned by the company, or \$270,055 in all.

Per mile of track owned, these amounts are: \$81,179 of stock; \$50,912 of funded debt; and \$1,087 of floating debt, or \$133,178 in all.

Compared with the statement for the close of the previous year, there is no change in stock and funded debt, and a decrease of \$263,581.37 in the floating debt. This latter is given as "consisting of loans and bills payable;" but it evidently does not include the overdue coupons, now amounting to some millions of dollars.

The cost of road and equipment is reported under the usual heads, and the totals are:

	1876.	1875.	Increase.	P. c.
Total.....	\$117,140,287 47	\$115,995,946 63	\$1,144,340 84	1.0

The items in which there are increases and decreases are:

Increase:	1876.	1875.	Increase.	P. c.
Superstructure, including iron.....	\$107,549 05			
Third rail between Elmira and Buffalo.....	1,060,032 18			
Buildings.....	16,294 47			
Water transportation, New York harbor.....	30,522 87			
Freight and other cars.....	1,803 00			
New York & Erie Railroad, and Erie Railroad and its franchisees.....	2,085 00			
Total.....	\$121,287 47	\$115,995,946 63	\$5,291,340 84	4.6

Decrease:	1876.	1875.	Decrease.	P. c.
Graduation and masonry.....	\$21,471 49			
Engine house, shops, machinery, &c.....	8,371 61			
Lands, land damages and fences.....	44,103 53			
Total.....	\$73,946 63	\$115,995,946 63	\$42,524 31	3.7

Balance of increase..... \$1,144,340 84

The increase in third rail owned being 181.3 miles, the expenditure on its account would appear to have been \$5,850 per mile of rail.

The work done on the road was:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Passenger.....	3,201,005	3,202,392	Dec..	1.387
Freight.....	7,507,842	7,598,518	Dec..	90,674 1.2
Working and switch'g.....	1,923,518	1,806,508	Inc..	6.4

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Total.....	12,632,365	12,607,416	Inc..	24,949 0.2
Passengers carried.....	5,042,831	5,052,855	Dec..	10,024 0.2
Tons carried.....	5,872,818	6,239,943	Dec..	267,125 4.3
Passenger mileage.....	163,074,790	155,396,804	Inc..	7,677,986 5.0
Tonnage mileage.....	1,040,421,921	1,016,618,050	Inc..	23,803,871 2.3

The moderate increases of traffic are notable, in view of the very low rates prevailing. An exceptional reduction was made in local passenger rates to many of the most important places reached by this road, besides the Centennial rates common to all roads and the extremely low through rates common to it and the other trunk lines; yet the increase in passenger mileage was only 5 per cent., and there was an absolute decrease in the number of passengers carried. The decrease in tonnage is due to a falling off of 545,000 tons in the quantity of coal carried by this road. In every other item except manufactures, there was an increase of the tonnage, amounting to 6½ per cent. in "products of the forest," 15 per cent. in "animals," 15 per cent. in "vegetable food," 22 per cent. in "other agricultural products," 10 per cent. in "merchandise," and 18 per cent. in "other articles." Coal was 55 per cent. of the total tonnage last year and 61 per cent. the year before. Agricultural products taken together were 21 per cent. of the tonnage last year and 17 per cent. the year before.

The earnings from this traffic were:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Passenger.....	\$3,427,426 45	\$3,461,304 31	Dec..	\$33,877 87 1.0
Freight.....	11,429,929 70	12,387,399 85	Dec..	857,470 7.0
Express.....	398,882 94	403,953 40	Dec..	105,070 40 26.8
Mails.....	400,077 09	400,556 73	Dec..	579 64 0.1
Rents.....	60,857 74	64,826 21	Dec..	3,968 47 6.1
Miscellaneous.....	135,087 22	168,718 10	Dec..	23,630 88 14.9

Total of rail- way property.....	1875-76.	1874-75.	Inc. or Dec.	P. c.
	\$15,862,461 14	\$16,876,858 60	Dec..	\$1,014,397 46 6.1

Other sources:	1875-76.	1874-75.	Inc. or Dec.	P. c.
Pavonia Ferry.....	\$234,286 08	\$219,163 98	Inc..	\$15,122 10 6.9
Pavonia horse railroad.....	21,273 18	24,098 69	Dec..	2,825 51 11.7
Erie baggage express.....	70,228 40	71,020 46	Dec..	792 06 11.1
Weohawken docks.....	50,609 30	66,061 45	Dec..	15,452 25 29.6
Grand Opera House rents.....	26,526 82	36,095 25	Dec..	9,568 43 26.5
Unclaimed baggage and freight.....	2,249 60	6,586 64	Dec..	4,337 04 65.9

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Interest on securities.....	\$281,260 65	\$205,625 21	Inc..	\$75,635 44 37.2
Buffalo, Brad- ford & Pitts- burgh B. R. royalty on oil.....	970 26		Inc..	970 26
Claims due prior to Oct. 1.....				
Total.....	\$172,236 21	\$172,236 21	Dec..	172,236 21

Total re- ceipts.....	1875-76.	1874-75.	Inc. or Dec.	P. c.
	\$16,539,765 33	\$17,677,746 49	Dec..	\$1,137,981 16 6.4

The income of the road from its business (that is, excluding interest on the securities held by it and receipts due for previous year's services) was:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Gross earnings.....	\$16,258,504 68	\$17,008		\$9,015
1874-75.....		17,299,885 07		18,415
Total.....	\$1,041,380 30	\$1,467	\$1,540	14.2

The additional track was nearly all third rail, and was laid too late in the season to be of much use during the last fiscal year.

The expenses are reported as follows for the two years:

Maintenance of Road and Real Estate:	1875-76.	1874-75.	Inc. or Dec.	P. c.
Repairs of road-bed and railway.....	\$1,458,889 02	\$1,680,182 52	Dec..	\$221,293 50 15.3
Cost of iron used for repairs.....	434,400 72	594,141 81	Dec..	159,741 09 36.8
Repairs of buildings and bridges.....	341,376 86	506,292 46	Dec..	164,915 60 48.3
Repairs of fences and gates.....	33,432 42	31,515 94	Inc..	1,916 48 5.9
Taxes on real estate.....	263,990 02	345,186 41	Dec..	81,196 39 30.8

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Repairs of telegraph.....	6,098 82	1874-75.		
Superintendence and contingencies.....	92,498 89	87,114 01	Inc..	5,384 88 6.2
Repairs of Machinery:				
Repairs of engines and tenders.....	655,836 29	607,719 85	Inc..	48,116 44 7.9
Repairs of engines and tenders.....	234,544 74	288,453 15	Dec..	53,908 41 23.0
Cleaning and housing engines.....	288,453 15	306,382 07	Dec..	17,928 92 6.2
Repairs of passenger and baggage cars.....	188,072 83	290,025 30	Dec..	101,952 47 54.2
Repairs of freight cars.....	231,135 75	270,510 31	Dec..	39,374 56 17.0
Repairs of tools and machinery.....	114,991 05	69,092 55	Inc..	45,898 50 66.4
Incidental expenses.....	163,001 09	100,316 47	Inc..	62,684 62 62.5
Office expenses, stationery, etc.....	257,126 37	232,761 34	Inc..	24,365 03 10.5
Telegraph operators.....	112,969 87	118,845 62	Inc..	5,875 75 5.2
Agents and clerks.....	904,170 84	835,859 94	Inc..	68,310 90 8.0
Loading and unloading freight.....	753,287 65	673,160 30	Inc..	80,127 35 11.9
Porters, watchmen and switchmen.....	321,634 38	324,499 31	Dec..	2,864 93 0.9
Wood and water station attendance.....	62,600 25	73,836 17	Dec..	11,235 92 18.0
Conductors, baggage men and brake- men.....	1,272,764 11	1,904,672 94	Dec..	631,908 83 49.6
Engineers and firemen.....	905,778 48	1,000,360 71	Dec..	94,582 23 10.5
Fuel, and preparing for use.....	1,110,341 94	1,075,953 19	Inc..	34,388 75 3.2
Oil and waste for engines and tenders.....	80,756 20	92,604 63	Dec..	11,848 43 14.7
" " " freight cars.....	86,750 14	110,247 71	Dec..	23,497 57 27.1
" " " passenger and bag- gage cars.....	26,724 52	26,638 76	Dec..	85 76 0.3
Loss and damage of goods and baggage.....	30,065 15	36,702 08	Dec..	6,636 93 22.1
Damage: injuries to persons.....	5,116 02	7,253 40	Dec..	2,137 38 41.8
Damage to property, including fires and cattle killed.....	14,774 06	10,760 10	Inc..	4,013 96 37.3
General office expenses.....	88,611 37	128,239 88	Dec..	39,628 51 44.7
General superintendence.....	141,809 62	233,463 06	Dec..	91,653 44 64.6
General office clerks.....	158,322 52	145,574 53	Inc..	12,747 99 8.7
Contingencies.....	202,411 18	208,825 87	Dec..	6,414 69 3.2
Legal expenses.....	92,908 48	118,306 87	Dec..	25,398 39 27.3
Hire of cars.....	218,115 31	159,596 52	Inc..	58,518 79 36.7

Recapitulation of Transportation Expenses:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Main. of road.....	\$2,630,496 45	\$3,921,370 57	Dec..	\$1,290,874 12 20.8
Maintenance of machinery.....	2,664,456 87	2,446,863 53	Inc..	217,593 34 9.0
Operating.....	6,936,268 46	6,910,896 85	Inc..	25,371 61 0.4
Total.....	\$12,231,221 78	\$12,679,130 95	Dec..	\$447,909 17 3.6

Other Expenses:

REPAIRS ON RAILROADS AND BRIDGES.....	263,390 02	345,186
TAXES ON REAL ESTATE.....		



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Editorial Announcements.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, except in the advertising columns. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery, and in their management, particularly as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE ERIE REPORT.

The Erie is the third of the trunk line reports that we have had for the year ending with September last, and so including a large part of the protracted season of extraordinarily low rates. The chief carrier of Western produce to Baltimore and the two chief carriers to New York have made their returns. There remains to report the company which carries nearly all the Philadelphia traffic, and carries likewise, and by a route as short at least as any, to New York and Baltimore, from which we shall not hear until next March. The Baltimore & Ohio report, however, is incomplete, only the President's report having been published as yet, and the details of earnings and expenses come later in the full report. This company, moreover, does not report the amount of its traffic even in its full report, so that we shall not be able to trace fully the development of traffic during the season of competition from the companies' reports. The Pennsylvania report will include the whole season of the railroad war—the entire campaign, perhaps, we should call it—and will include a longer period of low average rates than that of any other trunk line; on the other hand, it will include a longer season of the heavy Centennial traffic.

The Erie report to the State Engineer and Surveyor of New York is presented very fully on another page, comparisons being made with the report for the previous year. The company was probably less able than any other to sustain a long contest such as it has just passed through; but we must remember that it has advantages as well as disadvantages due indirectly to its very poverty. The Erie is worked by the officer of a court; it is not expected to pay any dividends on its stock; and no immediate change in its control will result if it does not pay interest on its bonds. Really, it has for a year and a half been relieved from the payment of interest on about three-fourths of its funded debt. Its competitors must pay interest on many millions of bonds or become bankrupt, and they are expected in addition to pay dividends on a still larger amount of stock. Large net earnings are essential to them, but not to it.

Compared with the New York Central & Hudson River Railroad, whose report we published last week, the Erie has many points of likeness and many of striking difference. Both are great feeders of New York city, and the chief carriers to it from the Northwest and the Great Lakes. Both reach several of the largest cities in the interior of New York. The Central, however, has long been rich and prosperous; it has not lacked for capital to put its road into the most effective condition to carry a large traffic economically. The Erie, on the other hand, has been un-

fortunate from the beginning. It once fell among thieves who did much to ruin it. It was afterwards controlled by proprietors who refused to see—at least to provide for—its most pressing needs; it has emphatically not been improved so as to conduct traffic with the greatest economy and make the best use of its opportunities. Its staff has been compelled to resort to makeshifts, to use the facilities they had, however antiquated or inadequate, and to permit its competitors on either side to leave it behind in their forward progress. It has not even a double track throughout its main line; its gauge gives it but one connecting road in the United States on which its cars can run freely, and many of the leading lines connecting with it to the West have been acquired by its rivals, while it has acquired nothing.

The New York Central has a great advantage over the Erie in the larger population on its line, and still more in its position as the chief channel for the enormous traffic between the West and New England. But the Erie has a decided advantage over the Central in its position close to coal, both anthracite and bituminous, which supplies it with a tonnage greater than all the rest which it carries, and affords it fuel at a cheap rate. Erie's expense per train mile for fuel is 22 per cent. less than the New York Central's, and this saving in coal alone would amount to \$450,000 on the latter road. The Erie, in fact, is admirably situated for traffic, and in spite of its steady course of misfortunes it still has a very large traffic, although it is not able to make as much profit out of it as might be desired. But even its profits in this worst of years, when doubtless a considerable part of its business was carried at a loss, is not such a trifling sum. The report shows that it was equivalent, after paying rentals, to 7 per cent. on \$45,000,000. Now the Erie Company, although it works 956 miles of railroad, owns only 526 miles, and but 244 miles of that has a double track, although there is third rail enough to bring this up to 356 miles. The Erie has a great deal of costly property besides its railroad, but so far as the railroad alone is concerned, the net earnings last year were not so bad after all. Indeed, it is not so much light earnings as a heavy capital account that has troubled the Erie all along. These are the figures, per mile of road and per mile of track owned:

	Per mile of road.	Per mile of track.
Stock.....	\$164,615	\$81,175
Funded debt.....	109,237	50,912
Floating debt.....	2,306	1,067
Total.....	\$276,058	\$133,154

This is a sufficient explanation of the Erie's troubles. Very few railroads in America can earn interest on any such amount, which is one-half greater per mile of road and more than twice as great per mile of track as the New York Central's capital. If there was half that capital really invested in the property, making it a thoroughly good road, with all the appliances required for economical working, it would probably be easy to earn a good rate of interest on it, even in bad times.

And if the road is ever to be able to produce good results, it must have more real capital. It cannot earn one per cent. even on its present eighty odd millions of stock; but it would probably be possible to earn 10 or 12 per cent. or even more on a few millions of money judiciously expended in improvements. But this is hardly worth talking about just now; there must be a reorganization (and perhaps more than one) before this can be done. The proprietors seem slow to learn that in order to save part of their past investments in this road they must add to those investments.

Curiously enough, the Receiver has been able to do something to increase materially the value of the property during the past year. More than a million of dollars has been expended for the extension of the third rail which has given the road a track of standard gauge from the coal fields to Buffalo, one of the most needed improvements.

The impulse given to the traffic on this road by the low rates of the year is less marked than on the New York Central. The Erie gained a little more in passengers (an increase over the previous year of 5 per cent. against 4.2 per cent. on the Central); but while the Erie's freight traffic increased but 2.3 per cent., the Central's increased no less than 19.3 per cent. These facts are susceptible of explanation, though at first sight it might appear that a reduction of rates alike on both roads should have a similar effect on the traffic. But, so far as passengers are concerned, the reduction was not alike on both roads. The Erie for some months maintained rates between New York and all the chief points where it competes with the Central—Buffalo, Niagara Falls, Rochester, Syracuse—two or three dollars below the Central's rate. This gained it considerable passenger traffic. Then for part of the season the Erie was a large part of a through route between the West and Philadelphia, which gave it a larger share of the Centennial traffic than it would have had otherwise. It is noticeable that the Erie's passenger traffic, despite its less mileage and less favorable connections, is larger than the Central's. On the other hand, so far as freight is concerned, its through traffic in grain and live stock was largely increased; but there was so large a falling-off

in its coal traffic—which is its largest freight business—that the other increases were nearly counterbalanced. Unfortunately the coal is the profitable traffic, and while the growth in grain, etc., made up in bulk of traffic for the loss of the coal, it did not make up the loss in gross and net earnings from that traffic.

In earnings there was a decrease of 1 per cent. in passenger receipts and of 7 per cent. in freight receipts, and in total earnings from the railroad the decrease was 6 per cent., which with the very moderate increase in traffic was better than was to be feared. There was also a decrease of 3½ per cent. in working expenses. The net earnings fell off about 9 per cent.

The savings in expenses are in maintenance of road almost exclusively, amounting under that entire head to about 21 per cent. In the items under these heads we find a saving of 27 per cent. in cost of rails for repairs, and of 43 per cent. in repairs of bridges and buildings. Maintenance of machinery shows an increase, but this is due to the introduction of charges for "renewals" of engines and cars. These renewals are properly chargeable to maintenance; but it seems that these renewals, or part of them, were of rolling stock which did not exist when the year began, except on the company's books. The "renewals" of engines and tenders absorb \$234,500, though but seven engines are reported rescued from the limbo of "broken up," and generally the locomotive stock is reported in a more depreciated condition than in the previous report.

The fact seems to be that the equipment at the beginning of the year was less than was reported; for within the year the company has constructed four engines and bought 20 new ones, a large number having been condemned and destroyed. The \$580,000 so expended for renewals, though probably insufficient to bring the equipment into thoroughly good condition, yet may represent a depreciation for which the business of previous years is properly chargeable.

It is curious to note that the expenditures for maintenance of road were considerably larger per mile of track on the Erie than on the New York Central (\$1,459 to \$1,076). This doubtless has not been because the Erie has been more lavish ("lavish" is not the word to use in connection with railroad expenditures last year), but because it had not been prepared in previous years, as the Central was, to endure heavy traffic for a long time without requiring much in the way of renewals. Probably both did as little as they could, but more work was indispensable on the Erie. The latter had an average of 9.6 trains each way daily over the entire length of its tracks; the Central an average of 10.3 trains.

The decrease in average receipts per unit of traffic was less on the Erie than on the Central. The average rates were higher, also, on the Erie.

On the two roads these rates and the expenses have been:

	1876.	N. Y. Cen.	1875.	N. Y. Cen.
Per passenger per mile—				
Receipt.....	2.102 cts.	1.910	2.227 cts.	2.140
Expense.....	1.854 "	1.690	1.951 "	1.360
Profit.....	0.248 "	0.220	0.276 "	0.780
Per ton per mile—				
Receipt.....	1.099 "	1.090	1.209 "	1.270
Expense.....	0.885 "	0.710	0.949 "	0.900
Profit.....	0.214 "	0.380	0.260 "	0.370

The Central thus during last year received lower average rates for both passengers and freight than the Erie, but its expenses were so much lower that its profit was more than three times as great per passenger per mile, and 60 per cent. more per ton per mile. The enormous disproportion in passenger expenses may be due partly to a difference in the method of dividing the expenses between freight and passengers; but then if any change is made, what is added to passenger expenses must be taken from freight expenses. It appears to cost the Erie a quarter more than the Central to carry a ton of freight a mile, and the difference is greater this year than ever before. We ventured some years ago to say that something like this would be the inevitable result should the Erie be permitted to remain without those improvements which would make it equal to its rivals. They, we said, were preparing to carry traffic at less expense than formerly, and the result would inevitably be a reduction in rates. Should the Erie not keep pace with them in reducing expenses, which could be done only by expenditures for equivalent improvements, the time would come when a rate which would yield a satisfactory profit to the Pennsylvania and the New York Central would little more than cover the working expenses of the Erie. Evidently that time is now impending. When we wrote, the Erie's expenses per ton per mile were about as low as the New York Central's—sometimes lower; now they are so much higher that a cent per ton per mile leaves the Central two and a half times as great a profit as the Erie can get from that rate. And the end is not yet.

The End of the Railroad War.

At last the contending trunk lines have come to a truce and have agreed upon a basis for making rates on the traffic for which they compete. As was reported at the time of the conference a few weeks ago, the basis of the agreement is that freight from competing points in the Northwest which is exported shall be charged the same

for freight from the place of shipment to its foreign destination, whatever may be the port from which it is exported; and the intention is that a shipper in Chicago or St. Louis may ship to Europe in differently by way of Boston, New York, Philadelphia or Baltimore, so far as the transportation charges are concerned. Of course it must come to this at last, that the total expenses (including merchants' charges and transfers as well as freight) must be the same by all ports if more than one port is to do any considerable export business in grain coming from the same district. If absolutely the same transportation charges can be maintained by way of all ports, the entire competition will be between the merchants and those who conduct the transfers at the different ports, in which, we understand, great differences exist.

For freight not exported a new basis of rates is established—at least, it is new for a part of the traffic. By the agreement made a year ago the east-bound rates from all Western points were to be based upon the Chicago-New York rate, and the differences were to be 10 per cent. in favor of Philadelphia and 13 per cent. in favor of Baltimore. By the new arrangement, this is the basis for the differences in rates only for freight from Chicago and points east of Chicago; for freight from St. Louis, Indianapolis and Cincinnati the difference is to be 14 per cent. in favor of Baltimore and 9 per cent. in favor of Philadelphia. This seems to be a recognition of the fact that Baltimore's advantage in distance to points in its latitude. Baltimore is but about one-eighth nearer than New York to Chicago, but it is 21 per cent. nearer to Cincinnati. The new basis, therefore, gives Baltimore a greater advantage for freight from the southern part of the great district in which all the trunk lines compete. This is the district which Baltimore can serve best.

The differences in rates on traffic not intended for export are, however, of comparatively little importance, as such traffic will not be diverted to any great extent by differences of rates.

The trouble with this basis is the difficulty of knowing what freight is exported, or rather of satisfying the various companies that their rivals do not give drawbacks on freight not entitled to them. This is a difficulty which will apply chiefly, we should say, to the lines to ports with the highest rates, and to New York more than to the more southern ports. Baltimore having the lowest rate on grain not exported, it will be necessary to pay a small rebate on the freight on grain exported from Philadelphia and a larger one on that exported from New York. Heretofore it has been at the other ports that rebates were paid, and not at New York. The New York roads have suspected their competitors to Philadelphia and Baltimore; now it is to be feared that the Philadelphia and Baltimore roads will suspect the New York lines, and we do not learn that any provision is made by which each party may know that the others are keeping the agreement faithfully.

West-bound freight rates seem to have the same basis as that for east-bound freight not exported.

New rates went into effect last Monday. They are very low, but a great improvement, of course, on those which have prevailed for the past eight months. For the three higher classes (including very little freight, however,) the winter rates in force for several years past (\$1.50, \$1.10, \$0.85 per 100 lbs. from Chicago to New York) are charged. The fourth-class rate is 35 cents; that for grain in bulk, 30 cents.

East-bound rates from New York to Chicago are 50, 45, 40, 30 and 25 cents per 100 lbs. for the four classes and "special." We believe they should be about twice as high, as this traffic can afford to pay better rates, and the necessity for reductions is on east-bound traffic, which increases as the rates decrease, and this is not the case with west-bound.

Whether the new agreement lasts longer or not, it will probably continue through the winter, and experience under it may lead to something better. We must remember that we cannot tell beforehand exactly what the results of any new agreement will be, and also that no agreement can last which works greatly to the disadvantage of any of the parties to it.

The Chicago & Northwestern.

The railroads extending westward from Chicago are on the average among the most prosperous in the country. Those south of the parallel of Chicago especially are generally profitable; the Chicago, Burlington & Quincy has not failed to pay 10 per cent. for many years; and the Chicago, Rock Island & Pacific, the Chicago & Alton and the Illinois Central, which formerly paid 10 per cent., have paid 8 per cent. throughout the dull times, though each one has had to sustain or partly sustain some extensions which, for the time at least, are a burden to them. The roads north of the parallel of Chicago—that is the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul—have not paid dividends regularly. The former for two years paid 10 per cent. on both its common and its preferred stock; but the last dividend on the common stock was in December, 1872 (3½ per cent.), and the last on the preferred stock in May, 1873 (also 3½ per cent.) Before that

time the preferred stock of this company had been looked upon as a very promising investment, likely to pay good dividends thenceforward, and almost as secure as the bonds themselves. Two years' dividends at the rate of 10 per cent. on common as well as preferred stock of course encouraged this feeling. It was about that time, we believe, that large investments were made in this stock by Dutch capitalists, who saw a promising opportunity for securing below par a stock which might in a few years (after a continuance of high dividends) be worth as much as Chicago, Burlington & Quincy, or other regular dividend-paying stock. But the company never since has had so profitable a business as when the Union Pacific was under construction; and it has extended its system enormously since that time, and in so doing has increased its funded debt, or that for which it is liable, more than two-thirds. The extensions for the most part do not yet earn enough—some of them not nearly enough—to pay the interest on the bonds issued to pay for their construction, and the company's surplus of net earnings after paying interest and rentals is much smaller than before these extensions were built. In 1870-71 this surplus was reported to have been about \$3,340,000; and the year before the panic (ending with May, 1873), it was about \$2,200,000; but for the half-year ending with November, according to a statement recently issued by the company, it was but \$916,000—this being considerably larger than for the previous year, and cited to justify the declaration of a dividend of 2½ per cent. on the preferred stock—the first for three and a half years.

This statement is interesting on other accounts. It gives the earnings and expenditures for the first half of the fiscal year, during about one-third or one-half of which we may assume that the traffic was unusually large, as there was then an active movement of last year's grain crop; while for the other half or two-thirds of the half-year, the business was probably lighter than usual, the Minnesota and Wisconsin wheat crops being light and coming forward slowly. This is further indicated by the reports of the Chicago, Milwaukee & St. Paul Company, which, being made for each month separately, indicate quite clearly the course of traffic in the district which is served both by it and by the Northwestern.

The Northwestern statement shows that for the six months the gross earnings were about 3½ per cent. less than for the corresponding period last year. Working expenses, however, were nearly 9 per cent. less, and there were further decreases in taxes, interest and rentals, so that the surplus is \$976,216 in 1876 against \$808,832 last year—an increase of more than 20 per cent.

The accuracy of this statement has been questioned in some quarters, it being hinted that it is hardly credible that net profits have increased while general business has been so dull, and the railroad war has made rates so low. But it must be remembered that the railroad war does not extend to all roads, and the Northwestern, owing to the modification of the Wisconsin law, has probably been able to charge average rates somewhat higher than those of last year. Besides, its suspension of dividends on preferred stock has not been due to a decrease of net earnings, but to an increase in the yearly interest charge, incurred for new roads which were largely through districts where traffic was still undeveloped. For years this interest account had been increasing, but it seems now to have ceased to grow, or rather to have begun to grow smaller. The new railroads have developed traffic very slowly, but they have doubtless seen their worst days; and the surplus of last year even was 5½ per cent. on the preferred stock, and for the last half-year is 4½ per cent., though but 2½ is divided.

The company's most important traffic is wheat, and the light crop last harvest must affect its earnings unfavorably. But its most southerly line (which is nearly 500 miles long) has a varied agricultural traffic, including corn, cattle and hogs, and it is not so exclusively a wheat road as is the Chicago, Milwaukee & St. Paul. One of its most productive lines is that farthest north—the Peninsula Division, in the Northern Peninsula of Michigan, which carries Lake Superior iron ore from the mines to Lake Michigan for shipment. One would suppose that this business would be the first to suffer in times like these, when iron smelting has greatly declined. But the times which have so tried iron manufacturing seem to have demonstrated the value of Lake Superior ores. The shipments during the past season were very much larger than those of the previous year, and, if we are not mistaken, as large as any heretofore. As the fall in prices has cut down the profits of iron works, they seem to have been compelled to use Lake Superior ore, which is consumed more extensively now than ever before. Doubtless this large business does not return the profits of the flush times of iron manufacturing; but its existence and development in these times is an indication that it will be permanent and so will continue to afford a large business to the carriers.

The Northwestern, moreover, like most Chicago railroads, has the very great advantage of a small capital account. Its stock and debt amount to but \$50,400 per mile of road, \$28,072 of which is in bonds, whose currency interest amounts to about \$2,075 per mile. The preferred stock coming next after those bonds requires but about \$325 per mile to pay the 2½ per cent. dividend.

Large profits are not required, therefore, to afford a return on the securities of this company. Net earnings to the amount of \$3,000 per mile will provide for the interest and 7 per cent. on the preferred stock; \$3,650 would afford 7 per cent. on the common stock in addition.

It has not been possible recently to make even these comparatively small profits; but it is not unreasonable to expect them at no distant day.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Lake Erie, Alliance & Wheeling.—Extended north 5½ miles to Palmyra, O. It is of 3 ft. gauge.

Iowa, Minnesota & North Pacific.—Track is laid from Monroe, Ia., north to Newton, 13 miles.

Omaha & Republican Valley.—Extended southward 7 miles to a point 10 miles from Valley Station, Neb.

Missouri & Western.—Extended from Brownsville, Kan., west to Oswego, 28 miles.

International & Great Northern.—Extended from Austin Summit west to Austin, Tex., 2 miles.

This is a total of 55½ miles of new railroad, making 2,283 miles completed in the United States in 1876, against 1,264 miles reported for the corresponding period in 1875, 1,808 in 1874, 3,606 in 1873, and 7,065 in 1872.

The Grain Movement for Thirty-three Weeks.

The shipments of grain of all kinds from the eight principal Northwestern markets for each week since April 22 have been, in bushels, by lake and by rail:

Week ending—	By lake.	By rail.	Total.	Per ct. by rail.
April 22.....	1,634,541	2,072,946	3,707,487	56
May 6.....	2,445,191	2,292,633	4,737,824	48½
" 13.....	1,538,526	2,302,940	3,841,466	60
" 20.....	1,602,170	2,016,304	3,618,474	55½
" 27.....	1,747,408	1,890,456	3,637,864	51
June 3.....	2,412,163	1,797,922	4,210,085	42½
" 10.....	2,894,915	2,147,070	5,042,985	42½
" 17.....	2,921,406	2,491,811	5,413,216	45
" 24.....	2,728,706	2,198,084	4,926,790	44½
July 1.....	1,821,155	1,784,548	3,605,703	49½
" 8.....	1,765,010	1,305,184	3,070,194	40½
" 15.....	1,648,508	1,228,678	2,877,186	42½
" 22.....	2,269,396	1,092,825	3,362,221	31½
" 29.....	1,466,502	1,038,208	2,504,710	41½
Aug. 5.....	2,055,243	1,283,268	3,338,511	38½
" 12.....	1,744,059	1,300,720	3,044,779	42½
" 19.....	2,150,292	1,614,256	3,764,548	42½
" 26.....	1,820,811	1,872,152	3,692,963	39½
Sept. 2.....	1,096,491	1,573,059	2,671,549	48½
" 9.....	2,374,473	1,818,411	4,192,884	43½
" 16.....	2,963,634	1,688,318	4,651,952	36½
" 23.....	2,968,594	1,820,361	4,788,955	44½
" 30.....	2,427,367	1,797,847	4,225,214	42½
Oct. 7.....	3,009,394	1,650,858	4,660,252	35½
" 14.....	2,680,729	1,858,991	4,539,720	42
" 21.....	2,673,647	1,800,887	4,474,534	40½
" 28.....	2,635,237	1,359,180	3,994,417	34
Nov. 4.....	1,550,948	2,351,914	3,902,862	60½
" 11.....	2,422,157	1,899,994	4,322,151	36½
" 18.....	1,967,483	1,872,271	3,839,754	42½
" 25.....	1,406,993	1,272,783	2,679,776	47½
Dec. 2.....	357,374	1,376,625	1,733,999	79½
" 9.....	44,333	1,380,369	1,424,702	97
Total for 33 weeks.....	87,428,425	55,548,001	142,976,426	45½

The lake shipments are too small to have any appreciable effect on the totals. As we said last week, the season of navigation for lake shipments closed virtually with November. Hereafter the business will be purely a rail business.

For the same 33 weeks the receipts at the different Atlantic ports have been:

	Corn.	Per cent. of total.	All grains.	Per cent. of total.
New York.....	32,030,317	35.0	59,467,481	47.8
Boston.....	6,589,026	10.9	9,864,980	8.0
Portland.....	593,876	0.9	1,002,356	0.8
Montreal.....	3,495,081	5.6	11,394,022	9.2
Philadelphia.....	14,070,028	22.3	21,707,235	17.5
Baltimore.....	13,715,700	21.8	17,553,785	14.1
New Orleans.....	2,313,720	3.5	3,259,309	2.6
Total.....	62,978,745	100.0	124,309,168	100.0

Though shipments were so light for the last week reported, receipts continued large, arrivals of boats at New York down the North River continuing through the week.

Compared with their standing at the close of the previous week, New York has declined considerably in corn and slightly in all grains; Montreal has declined slightly in both; Philadelphia has declined a trifle in corn but held its rank in all grains; Baltimore has gained in both. The full effect of the closing of navigation will be seen later.

During the last week reported the proportion of the total corn receipts arriving at each port were: Baltimore, 33%; Boston, 22%; Philadelphia, 18; New York, 16½; New Orleans, 7½. For grains of all kinds these proportions were: New York, 44½; Baltimore, 20½; Philadelphia, 14½; Boston, 13½; New Orleans, 4½.

New York's corn receipts were unusually light.

NEW PUBLICATIONS.

The Complete Practical Machinist: Embracing Lathe Work, Vise Work, Drills and Drilling, Taps and Dies, Hardening and Tempering, the making and use of Tools, etc., etc.; by Joshua Rose. Illustrated by 130 engravings. Henry Carey Baird & Co., Philadelphia, 1876.

If one may judge from the title page and preface of Mr. Rose's book, the author has attempted to supply a long existing want by the production of a complete manual for the use of the machinist; a sort of *vade mecum* to which the puzzled artisan can turn for aid and counsel; a book which, though founded on correct theory, is yet to be conched in terms so simple that the least learned mechanic shall be enabled to understand it; a book indeed to contain in concise form the summing up, the generalization, as it were, of the best practice of the best shops; and these generalizations, these fundamental principles, these *formule* (as the author calls them) are to be arranged—so says the preface—in so logical an order that "each formula is the natural sequence of its predecessor." The ambition of the author is a laudable one; and the prospect before the expectant reader seems pleasant. Let us see how the reality fulfills the promise of the introduction.

Chapter I. treats of "Lathe and Machine Tools," and contains a discussion on the requirements of the good tool, its various angles, shapes, etc. While many of the author's remarks are doubtless true, and much to the point, we do not think he makes nearly so good a statement of the case as Mr. Holtzappel does in his article on the same subject (*Turning and Mechanical Manipulation, Vol. II., p. 527*), either in general compass or detailed instruction. Where Mr. Rose would say "add or subtract a little, bottom, top or side rake," Mr. Holtzappel tells us exactly how many degrees of clearance experience has shown to be suited for each particular case. Holtzappel further tells us how, by means of a Nasmyth's tool

gauge, we may determine what angles of clearance we have ground. Mr. Rose, we think, falls into the common error of making the clearance below the point of the tool—"the bottom rake," he calls it—excessively great. We do not see that any more is ever needed than will just suffice to clear the work, i. e., the angle usually recommended by the best writers (from 3° to 5° from the perpendicular): any more, by our author's own confession, only tends to weaken the point of the tool without lending any new advantages. The author throws great stress upon the use of "spring tools," that is, tools bent in the shank and so arranged that undue pressure arising from variations of cut or hardness may cause the tool point to spring from the work instead of digging into it; but he does not allude in this place (although the sequence seems obvious) to the proportionately good results obtainable by dragging the cutting tool instead of pushing it. Nor does he in this chapter the discussion of slotter tools (another evident sequence), but reserves their consideration to a chapter on "Laps," page 172. (The sequence is not so obvious.)

The use of "spring" tools necessarily violates one of the author's own canons, a very good one, too, that "all tools should be fastened or held so that their cutting edges are as near the tool post as possible."

The remarks of Mr. Rose in Chapter II., on "Cutting Speed and Feed," are in the main very good, especially those advocating the heavy roughing cut with rapid feed and slow speed, but we are surprised that he does not dwell, in this place, upon the advantages of the very broad feed finishing cuts.

He gives for steel of 3 in. diameter a speed of 18 feet a minute and a feed of 1-25 of an inch for roughing; but would finish with a speed of only 15 feet and a feed of 1-30 of an inch. Even for cast iron he does not recommend the use of more than 1/4 inch feed for finishing.

Chapter III., continuing the subject, discusses "Boring Tools for Lathe Work" and gives a number of shapes suitable for different materials and treats at some length of the reasons which govern the form of the tool.

Chapter IV. is devoted to a discussion of screw-cutting tools, and it seems, considering the prevalence of screw-cutting lathes, that an unnecessarily large space is devoted to screw-cutting by hand, and the making of "chasers" for inside and outside work. The very existence of special bolt-and-nut threading machines is entirely ignored; and it sounds oddly enough in these days to hear a man say: "The quickest way to cut a number of threads upon bolts requiring to have an ordinary good fit is to take about two good cuts with a screw tool in the lathe, and then fastening a solid die in the vise to screw the bolt through the solid die by the aid of a wrench on the bolt heads. * * * Bolts threaded thus may be screwed at least four times as quick as by finishing them entirely in the lathe."

Perhaps they can be; but not nearly so quickly as they may be cut in a bolt-cutting machine, having dies that open automatically at the end of the thread and permit the bolt to be withdrawn and another substituted without stopping or reversing the machine.

A great deal of this advice about hand cutting and other matters seems only applicable to the case of somebody in the backwoods or remote confines of civilization; for surely no one near a modern machine shop could hope to compete by such means with modern usage. Indeed, it is difficult to see exactly what auditory the book is directed to: information of the most specific kind is given on some subjects, along with minute and explicit directions and advice that would seem to imply that the artisan is far removed from the dealers in machinists' supplies and patent labor-saving devices; and yet the author suddenly begins, under the caption, "General Remarks on Turning," to insert a series of advertisements of special tools and gauges, lathe dogs and drivers, centering devices, etc., etc., which may be purchased of Messrs. Brown, Jones & Robinson in New York. In fact, the notices of the productions of the doubtless excellent establishment are very numerous throughout the book and are not always well timed.

Four pages on centre-drilling and protestations against countersinking with the centre punch (who in any well-regulated shop would do it?) recommend the use of the square centre as a countersinking tool; but it seems to us that the tool described on page 198 is much better and much easier to make accurately. (A reamer made by cutting away half the cone of a lathe centre by a plane through its axis, and hardening and sharpening one edge of the remaining half for a cutter.)

Much of the matter in the book is of a very desultory character. Over and over again, and often in the most unexpected places, are we told the same facts or given the same trite counsels. Thus, having learned in a chapter on "Tool Steel" that springs should be hardened by "frying them in oil" of a given composition, and furthermore that springs are stronger with the "forged skin on," we are surprised to have the whole thing repeated in a chapter on "Vise Work."

It is unnecessary to be informed two or three times that red marking should be used when fitting taper plugs to taper holes; and it is not complimentary to any intelligent mechanic to tell him four times that if he has a piece of very irregular work clamped to his lathe's face-plate or held between its centres he should balance it by clamping a counterweight to the face plate. In his chapter on "Tool Steel" the author suddenly rushes off to dilate—for six pages—on the wear of metal surfaces; and then winds up his chapter by half a page of ideas on "Annealing and Softening," and about as much on "Mixed Metals." He gives a number of different rules (that might in some cases be very convenient) for calculating the change wheels required for given pitches of screw threads; and also a little good (but not new) advice on the subject of belting. He tells us, however, that belts used with the "grain or smooth side to the pulley will transmit 30 per cent. more power than will the same belt with the flesh side to the pulley"; also that "a pulley covered with leather will transmit 30 per cent. more power without slipping than one not so covered." Therefore

it follows that by using our belts smooth side to the pulley and by lagging the pulley we shall gain, according to our author, 30 per cent. in the first instance and an additional 30 per cent. in the second case; or we shall have a total gain of 60 per cent. more power than could be transmitted by using unlagged pulleys and the rough side of the leather. There is undoubtedly a small percentage of saving in the use of belts with the smooth side to the pulleys, owing to the harder and more durable character of that side, to the larger area of surface contact obtained by using two smooth surfaces together, and to the fact that the belt is more flexible when curved with the hard side towards the inside of the circle. It is possible, however, that on rough pulleys better adhesion might result from using the rough side of the belt. As for lagging, the gain will be exactly that due to the difference of friction between two surfaces of leather, and one of leather and one of iron; and in no case will it amount up to 30 per cent.

It is not clear why the author always uses a weight of 36,000 lbs. raised one foot high in a minute as a "horse power" instead of the usual 33,000 lbs.; nor do we think circumstances will be found with sufficient accuracy by multiplying the diameters by 3 1/4 (page 119): 3 1-7 is much nearer. If the innocent mechanic attempted to apply Mr. Rose's rule to the case of two pulleys of, for example, 4 feet diameter, he would find his belt when made 5 inches too long. There is also another element of error in this rule: the part of a belt which is not in contact with the pulley rims is (if the pulleys differ in diameter) longer than twice the distance between the centres and corresponds more nearly to twice the length of the hypotenuse of a right-angled triangle having for its base the distance between the pulley centres and for its perpendicular the difference of diameters of the two pulleys.

It does not seem to us that Mr. Rose does full justice to the subject of journals bearings. While he gives some good physical reasons why cast-iron boxes are peculiarly good under limited pressure and speed if they present sufficient wearing surface, he does not tell us how we are to find the effective maxima of pressure or speed; he does not give us any data from which we may determine the proper length or diameter for journals; nor does he give to cast iron due credit for good performance under very heavy pressures, with plenty of surface and good lubrication. He discourses at length on the injurious wearing of rotating discs; but only discusses one case (that of steam valves, so shaped), and neglects the fact that discs when sufficiently large and well oiled work excellently under immense pressures. For example, many large mills have heavy vertical shafts weighing thousands of pounds supported with great success by cast-iron (disc-shaped) steps running in oil.

The mechanical execution of Mr. Rose's book is very good; the illustrations numerous and satisfactory.

But taking the book as a whole and without regard to its faulty rhetoric and rambling character, we cannot think that it is up to the requirements of the present state of the art. Many topics of vital importance are neglected or omitted: thus nothing is said of the use of standards (gauges, calipers, mandrels, etc.), or of manufacturing interchangeable parts. The author appears to ignore the very existence of such important tools as special machines for traverse drilling, for horizontal drilling or for bolt-cutting.

The book is an interesting one and contains much that is very valuable; and had he called it the "Practical Machinist" and omitted the word "complete" in the title it would have expressed its true character much better. "Practical" it may be, but not "complete."

General Railroad News.

ELECTIONS AND APPOINTMENTS.

New York, Providence & Boston.—At the annual meeting in Providence, Dec. 13, the following directors were chosen: Charles H. Salisbury, Providence, R. I.; Henry Howard, Coventry, R. I.; Nathan F. Dixon, Westerly, R. I.; A. S. Matthews, Stonington, Conn.; John A. Burnham, Boston; Samuel D. Babcock, D. B. Babcock, Henry Morgan, Wm. F. Cary, Jr., J. Boorman Johnston, George F. Miller, New York.

Boston & Maine.—At the annual meeting in Lawrence, Mass., Dec. 13, the old board was re-elected, as follows: George C. Lord, Nathaniel J. Bradley, John F. Osgood, Boston; Nathaniel G. White, Lawrence, Mass.; James B. Nichols, Haverhill, Mass.; Amos Paul, South Newmarket, N. H.; Wm. H. Stevens, Dover, N. H.; Nathaniel W. Farwell, Lewiston, Me.; Samuel E. Spring, Portland, Me.

Manchester & Ashburnham.—This company was organized at Manchester, N. H., Dec. 13, by the election of the following directors: Joseph Stone, Person C. Cheney, David Cross, Hiram K. Stayton, Manchester, N. H.; Samuel R. Payson, Edmund Dwight, John C. Palfrey, Boston. The board organized by electing Samuel R. Payson President; David Cross, Clerk.

Fall River.—At the annual meeting in New Bedford, Mass., Dec. 14, the following directors were chosen: J. A. Beauvais, Charles R. Tucker, G. A. Bourne, L. M. Kollock, Wm. R. Wing, George R. Phillips, George Wilson, John H. Denison, New Bedford, Mass.; L. S. Judd, Fairhaven, Mass.; R. T. Davis, John D. Flint, Fall River, Mass.; John H. Perry, Boston.

Boston, Clinton, Fitchburg & New Bedford.—Mr. Nathaniel Thayer, Jr., has been chosen President, in place of Solomon H. Howe, resigned.

Rhode Island & Massachusetts.—At the annual meeting in Providence, R. I., Dec. 13, the following directors were chosen: Harvey Chase, George F. Wilson, Jonathan Chase, E. J. Nightingale, Henry B. Metcalf, Arnold B. Chase, Olney Arnold, Stafford W. Razez, George L. Littlefield. The board elected Harvey Chase President; George F. Wilson, Vice-President; E. J. Nightingale, Secretary and Treasurer.

Central of Georgia.—Mr. David W. Apple has been appointed General Western Agent, with office at Atlanta, Ga. He has been for some time General Ticket Agent of the Western Railroad of Alabama.

Western Union Telegraph.—Gen. Anson Stager, of Chicago, has been chosen a Vice-President.

Southern Minnesota.—Mr. S. Friedlander, late of the St. Louis, Kansas City & Northern, has been appointed Superintendent of Telegraph and Train Dispatcher, in place of J. M. Nye, resigned.

Utica, Chenango & Susquehanna Valley.—At the annual meeting in Utica, N. Y., Dec. 12, the following directors were

chosen: Samuel Sloan, John Brislin, William E. Dodge, Moses Taylor, Lewis Lawrence, Miles C. Comstock, Daniel Crouse, Hiram Hurlbut, Percy B. Pyne, Eli Avery, Geo. W. Chadwick, Daniel B. Goodwin, Devillo White. The road is leased to the Delaware, Lackawanna & Western.

Atlantic & North Carolina.—Mr. L. W. Humphrey, President of the company, has resigned his position as a State director, and has been chosen a director on behalf of the stockholders.

West Point & Hanover Junction.—At the last annual meeting in West Point, Va., Charles L. Pearson was chosen President, with the following directors: George W. Pearson, Chas. L. Pearson, Jr., George A. Anderson, John Matheson, George Woodruff, all of Trenton, N. J. Mr. John Matheson is Secretary; George A. Anderson, Counsel; W. D. Crane, Agent, with office at No. 29 Broadway, New York.

Baltimore & Ohio.—At the first meeting of the new board Mr. John W. Garrett was unanimously re-elected President for the ensuing year, which will be the nineteenth of his occupancy of that office.

Chesapeake & Ohio.—At the annual meeting in Richmond, Va., Dec. 7, the following directors were chosen: John Echols, W. C. Wickham, Virginia; Pliny Plak, New Jersey; C. F. Huntington, A. A. Low, Lloyd Aspinwall, David Stewart, A. S. Hatch, Wm. Whitworth, Jr., J. G. Clark, John Castree, New York. The only new director is Mr. Castree, who succeeds H. C. Parsons, of West Virginia.

Duck River Valley.—Mr. E. F. Falconnet is Chief Engineer and Superintendent and has his office in Columbia, Tenn.

Texas Western.—At the annual meeting in Houston, Tex., recently, the following directors were chosen: T. W. House, T. H. Scanlan, Peter Floeck, Conrad Bering, John T. Brady, Peter Gabel, S. M. McAsahan, L. J. Latham and J. B. Likens.

Chicago & Northwestern.—Mr. Charles Murray has been appointed Superintendent of the Galena Division, in place of E. J. Cuyler, transferred to the Wisconsin Division. Mr. Murray has been for some time local Freight Agent in Chicago.

Richmond, Fredericksburg & Potomac.—At the adjourned annual meeting in Richmond, Va., Dec. 13, Mr. J. M. Robinson was re-elected President, with the following directors: E. Chauncey, H. A. Claiborne, Philip Haxall, C. S. Mills. The reappointment of Mr. Andrew Johnston as director for the State of Virginia was announced at the same time.

St. Paul & Pacific.—At the annual meeting recently the following directors were chosen: Frederick Billings, Woodstock, Vt.; George Stark, Nashua, N. H.; Charlemagne Tower, C. B. Wright, Philadelphia; George W. Case, Pittsburgh; Alexander Ramsey, St. Paul, Minn.; Wm. W. McNair, Minneapolis, Minn. The board elected C. B. Wright, President; George Stark, Vice-President; Samuel Wilkeson, Secretary; George E. Beebe, Treasurer. The road is now in possession of the trustees under the first mortgage.

PERSONAL.

—Mr. Octavius Cohen, a prominent merchant of Savannah and for several years past a director of the Central Railroad Company of Georgia, died recently at his residence in Savannah.

—Dr. Edwin Eldridge, President of the Utica, Ithaca & Elmira Company, chief owner of the Elmira Rolling Mill, and a large holder of other railroad and manufacturing stocks, died at his residence in Elmira, N. Y., Dec. 16, of congestion of the lungs, after a short illness.

—Mr. S. E. Mayo has resigned his position as General Ticket Agent of the Delaware & Hudson Canal Company's lines, to take effect Jan. 1.

—In the Circuit Court at Sandusky, O., last week, on motion of the District Attorney, a *not a prosequi* was entered in each of the indictments against Rush B. Sloane, the defaulting ex-President of the Cincinnati Sandusky & Cleveland Company. This action has caused much surprise, and the Attorney General of the State has since taken action to overrule the District Attorney's proceedings.

THE SCRAP HEAP.

Railroad Manufactures.

The Kellogg Bridge Company has the contract for rebuilding the portion of the Louisiana Bridge over the Mississippi recently destroyed by the washing out of a pier. The two 127-foot spans thus lost are to be replaced by one span 320 feet long over all. A temporary structure is now in use.

The Michigan Car Company, at Detroit, has an order for 300 freight cars.

The Maiden Creek Iron Works, in Berks County, Pa., have been purchased by a party of Lebanon capitalists, who intend to make extensive improvements. The property consists of a charcoal furnace, a number of dwellings and small buildings and a large tract of iron and wood land.

Neshannock Furnace, at New Castle, Pa., has been repaired and has gone into blast again, making Bessemer pig iron.

The Nimson Steam Forge, at Allentown, Pa., has stopped work, but will start up again Jan. 1, when a new lessee will take charge.

The Harrisburg (Pa.) Company's Works are running on an order for 150 cars.

The Hollidaysburg Iron & Steel Company, a new organization, has bought the old rolling mill in Hollidaysburg, Pa., and the blast furnace at McKee's Gap, and has leased the mining right on a large tract of iron land near the furnace.

Knauer & Kaufmann's steam forge in Knauertown, Chester County, Pa., is running full time.

The Logan Iron Company is building a blast furnace three miles from Gore, O., in the Hocking Valley region. It is to be connected with the Newark, Somerset & Straitsville road by a narrow-gauge track.

The Roane Iron Company's rail mill, at Chattanooga, Tenn., is at work on 30-pound iron rails for the Duck River Valley road.

The Red River Furnace in Estill County, Ky., with the other property belonging to the company, was sold recently at sheriff's sale for \$35,000.

The Samson Rail Joint, manufactured by the American Railway Supply Company, of Pittsburgh, is already in use or has been ordered for trial by the Chicago, Rock Island & Pacific, the Chicago & Alton, the Chicago, Burlington & Quincy, the Illinois Central, the Missouri Pacific and other Western roads.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Dec. 9 receipts and shipments are reported as follows, in bushels:

	1876.	1875.	Inc. or Dec.	P. c.
Lake ports' receipts.....	2,668,571	3,188,546	Dec.	519,675 16.2
" " shipments.....	1,497,702	1,147,094	Inc.	350,608 30.4
Atlantic ports' receipts.....	2,792,418	1,702,818	Inc.	1,089,600 63.4

Of the shipments from lake ports, 97 per cent. was by rail this year, and the whole in the two previous years.

Chicago receipts and shipments for the week ending Dec. 16 were:

	1876.	1875.	Increase.	P. c.
Receipts.....	1,116,065	796,551	319,504	40.1
Shipments.....	692,262	248,954	444,308	178.4

The low rates apparently have a great effect in stimulating the winter movement.

Railroad Earnings.

Earnings for various periods have been reported as follows:

Year ending Sept. 30:	1875-76.	1874-75.	Inc. or Dec.	P. c.
Boston & Lowell.....	\$1,127,821	\$1,153,849	Dec..	2.2
Expenses.....	812,030	1,000,090	Dec..	18.8
Net earnings.....	\$315,861	\$153,759	Inc..	105.4
Earnings per mile.....	13,589	13,993	Dec..	2.9
Per cent. of exps.....	71.99	86.87	Dec..	14.68
Chesapeake & Ohio.....	1,599,513	1,459,189	Inc..	9.6
Expenses.....	1,243,036	1,112,921	Inc..	11.8
Net earnings.....	\$356,477	\$346,268	Inc..	2.8
Earnings per mile.....	3,717	3,390	Inc..	9.6
Per cent. of exps.....	77.69	76.23	Inc..	1.46
Erie.....	16,539,765	17,677,746	Dec..	6.4
Expenses.....	12,626,586	12,679,131	Dec..	0.4
Net earnings.....	\$3,913,229	\$4,998,615	Dec..	21.8
Earnings per mile.....	17,549	18,756	Dec..	6.4
Per cent. of exps.....	76.36	75.13	Inc..	1.23

Eleven months ending Nov. 30:

	1876.	1875.		
Atchison, Topeka & Santa Fe.....	\$2,282,298	\$1,376,004	Inc..	\$906,294 65.9
Burlington, Cedar Rapids & Northern	1,037,583	1,200,574	Dec..	162,991 13.6
Cairo & St. Louis....	246,181	254,358	Dec..	8,157 3.2
Canada Southern.....	1,571,781	1,127,834	Inc..	443,947 39.4
Central Pacific.....	16,773,166	15,696,854	Inc..	1,076,312 6.9
Chicago & Alton.....	4,595,831	4,287,462	Inc..	308,379 7.2
Chi., Milwaukee & St. Paul.....	7,448,139	7,507,850	Dec..	62,711 0.4
Cincinnati, Lafayette & Chicago.....	342,874	362,850	Dec..	19,976 5.5
Denver & Rio Gra'de, Main Line.....	359,151	324,448	Inc..	34,703 10.7
Illinois Central.....	6,647,007	7,123,122	Dec..	575,515 8.1
Indianapolis, Bloom. & Western.....	1,349,148	1,214,680	Inc..	134,468 11.1
International & Gr't Northern.....	1,231,858	1,175,443	Inc..	56,415 4.9
Michigan Central ...	6,265,724	6,069,899	Inc..	185,825 3.1
Missouri, Kansas & Texas.....	2,920,811	2,609,187	Inc..	311,624 11.9
St. Louis, Alton & T. H., Belleville Line	443,843	511,044	Dec..	67,201 13.1
St. Louis Iron Mountain & Southern.....	3,509,949	3,305,292	Inc..	204,657 6.2
St. Louis, Kansas City & Northern.....	2,874,843	2,378,165	Inc..	496,678 20.9
Toledo, Peoria & Warsaw.....	1,313,667	1,006,726	Inc..	306,941 30.5

Ten months ending Oct. 31:

Burlington & Missouri River in Nebraska.....	\$743,864	\$571,638	Inc..	\$172,226	30.1
Flint & Pere Marquette.....	809,671	854,190	Dec.,	44,519	5.5
Louisville, Paducah & Southwestern...	377,008

Month of October:

Burlington & Missouri River in Nebraska.....	\$144,422	\$103,222	Inc ..	\$41,200	39.9
Denver & Rio Grande	36,111	28,988	Inc ..	7,123	24.0
Expenses	20,201	18,335	Inc ..	1,866	10.0

Net earnings.....	\$15,910	\$10,653	Inc..	\$5,287	49.3
Per cent. of exps.....	55.94	63.23	Dec..	7.29	11.5
Flint & Pere Marquette.....	80,889	89,632	Inc..	257	0.3
Great Western, of Canada.....	391,800	396,820	Dec..	5,020	1.3
Expenses.....	296,500	281,576	Inc..	16,024	5.3
Net earnings.....	\$95,300	\$115,244	Dec..	\$20,044	17.4
Per cent. of exps.....	75.70	70.96	Inc..	4.74	6.7
Louisville, Paducah & Southwestern.....	42,638	41,179	Inc..	1,459	3.5
Rome, Watertown & Ogdensburg.....	139,945	119,940	Inc..	20,005	16.7

Month of November:

Atchison, Topeka & Santa Fe.....	\$225,955	\$187,183	Inc..	\$38,772	20.7
Burlington, Cedar Rapids & Northern	94,908	127,879	Dec..	32,971	25.8
Cairo & St. Louis.....	30,129	27,934	Dec..	7,808	25.8
Canada Southern.....	148,050	134,290	Inc..	13,760	10.1
Central Pacific.....	1,673,000	1,515,636	Inc..	159,104	10.1
Chicago & Alton.....	377,553	395,779	Dec..	18,226	4.6
Chi., Mil. & St. Paul	766,003	927,930	Dec..	161,930	17.4
Cincinnati, Lafayette & Chicago.....	27,371	34,287	Dec..	7,116	26.0
Denver & Rio Gra'de, Main Line.....	30,207	30,411	Dec..	204	0.7
Denver & Rio Gra'de, Trinidad Ex.....	13,930				
Illinois Central.....	680,092	773,022	Dec..	192,968	28.4
Ind., Bloom. & West's	93,646	141,300	Dec..	47,654	33.7
International & Great Northern.....	214,200	188,466	Inc..	25,734	13.7
Michigan Central.....	541,345	587,270	Dec..	45,925	7.8
Missouri, Kansas & Texas.....	324,886	300,534	Inc..	24,352	8.1
Rome, Watertown & Ogdensburg.....	133,487	115,068	Inc..	18,419	16.0
St. Louis, Alton & T. H., Belleville Line	48,280	50,700	Dec..	2,411	4.8
St. Louis, Iron Mt. & Southern.....	466,000	429,765	Inc..	36,235	8.4
St. Louis, Kan. City & Northern.....	282,845	280,626	Inc..	52,219	22.6
Toledo, Peoria & Warsaw.....	101,075	123,920	Dec..	22,845	18.4
Toledo, Wabash & Western.....	351,594	305,927	Dec..	44,333	11.2

First week in December:

Denver & Rio Grande, Main Line.....	7,692	7,190	Inc ..	492	6
Denver & Rio Grande, Trinidad Extension	3,548
St. Louis, Iron Mt. & Southern.....	\$129,000	\$119,812	Inc ..	\$9,188	7

Second week in December:

Chicago, Milwaukee & St. Paul.....	\$143,000	\$171,374	Dec..	\$28,374	16
Michigan Central...	122,093	139,987	Dec..	17,894	15

Week ending Nov. 24:

Great Western, of Canada.....	£15,082	£16,815	Dec..	£1,733	10
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Week ending Nov. 25:

Grand Trunk.	£37,200	£44,300	Dec..	£7,100	16
S. S. Freight Rates					

Southern Freight Rates.

The steamer lines from New York to Norfolk, Charleston and Savannah, with their rail connections, have adopted a new tariff, the rates from New York to leading Southern points being now as follows per 100 pounds:

	First class.	Second class.	Third class.	Fourth class.	Fifth class.
New York to Memphis, Tenn.....	\$0.79	\$0.72	\$0.66	\$0.51	\$0.46
Nashville, Tenn.....	0.62	0.57	0.53	0.42	0.37
Little Rock, Ark.....	1.24	1.12	1.01	0.81	0.69
Jackson, Miss.....	1.61	1.34	1.20	0.83	0.77
Gainesville, Ala.....	1.45	1.30	1.17	0.93	0.87
Gainesville, Ala.....	1.36	1.23	1.07	0.81	0.76

The changes are made in consequence of changes in all rates.

Coal Movement.

Coal tonnages for the week ending Dec. 9 were:

	1876.	1875.	Inc. or Dec.	P. c.
Anthracite.....	416,750	424,646	Dec..	1.9
Semi-bituminous.....	82,572	60,499	Inc..	3.4
Bituminous, Pennsylvania.....	50,022			

The coal tonnage of the Pennsylvania Railroad for eleven months ending Nov. 30 was:

	Tons.
Anthracite.....	728,825
Semi-bituminous, Broad Top.....	97,187
Clearfield and Snow Shoe.....	1,134,864
Cumberland.....	130,236
Bituminous, Galitzin and Mountain Region.....	193,008
Westmoreland Region.....	815,809
West Penn. Div. and Southwest Pa. Branch.....	386,551
Pittsburgh Region.....	1,280,554

Total coal.....

Coke.....

Total coal and coke.....

For the eleven months ending Dec. 2 the Pittsburgh Division of the Baltimore & Ohio delivered to the Main Line at Cumberland 216,599 tons of coal, of which 132,808 tons were gas coal, 52,157 tons Keystone Company, and 31,634 tons Elk Lick.

Receipts of coal by canal at Cleveland, O., for the season just closed were 160,047 tons. Shipments by lake for the season were 418,817 tons, of which 99,338 tons went to Canadian ports.

Through Freight Rates.

The new rates on west-bound freight are as follows per 100 pounds from New York:

	First class.	Second class.	Third class.	Fourth class.	Special.
New York to	40 cts.	35 cts.	30 cts.	25 cts.	20 cts.
Cincinnati.....	41 "	36 "	31 "	26 "	21 "
Detroit.....	40 "	35 "	30 "	25 "	20 "
Indianapolis.....	47 "	43 "	38 "	33 "	28 "
Chicago.....	59 "	45 "	40 "	35 "	30 "
Peoria, Ill.....	56 "	50 "	45 "	40 "	35 "
Louisville.....	60 "	55 "	45 "	40 "	35 "
St. Louis.....	67 "	61 "	55 "	49 "	34 "

The east-bound rates from Chicago, which also went into force last Monday, are:

	Class.	Grain in bulk.	Dressed meat.	Bulk meat.
Chicago to	1. 2. 3. 4.			
New York.....	1.50 1.10 .85 .55	.30	.55	.40
Boston and Port-				
land.....	1.60 1.20 .90 .40	.35	.70	.45
Baltimore.....	1.31 .96 .74 .30	.25	.57	.35
Philadelphia.....	1.35 .99 .77 .31	.27	.58	.36
Buffalo.....	.80 .60 .45 .22	.20	.35	.25

Flour per barrel is double the rate of grain per 100 lbs. Cheese in 10,000 lbs. lots and grass seed are taken from Chicago to New York at 45 cents. Boxed meats go at the fourth-class rate.

ANNUAL REPORTS.

Boston & Maine.

This company owns a main line from Boston north by east to Portland, Me., 118.25 miles; the Medford Branch, 2 miles; Methuen Branch, 35 miles, and the Great Falls Branch, 2.75 miles. The Methuen Branch is not worked, but is leased to the Manchester & Lawrence Company. The company works under lease the Newburyport Railroad, 26.5 miles; the Danvers Railroad, 9.25 miles; the West Amesbury Branch, 4.5 miles; the Lowell & Andover Railroad, 9.5 miles, and the Dover & Winnisquam Railroad, 29 miles, making a total of 126.5 miles owned and 201.75 worked. The system occupies very much the same ground as that of the Eastern Railroad, and has been worked in competition with it for years; but the company, by a more conservative management, by making fewer and more careful investments in outside property, and by a more judicious arrangement of its capital account, has avoided the ruin that has fallen upon the Eastern and has remained not only a solvent, but a dividend-paying corporation. Its present report is for the year ending Sept. 30, 1876.

The equipment consists of 73 engines and 11 snow-plows; 166 passenger-train cars, and 1,620 freight cars. The company holds \$27,000 of the own stock and has \$287,752.09 invested in Dover & Winnisquam stock and improvements; \$70,060.24 in a steamboat and wharves on Lake Winnisquam; \$152,430 in Danvers Railroad bonds and improvements; \$303,167 in Newburyport Railroad bonds and stock, and \$1,176 in Lowell & Andover Railroad improvements.

The capital account at the close of the year was as follows: Stock, received for 70,000 shares (\$54,714 per mile).....\$5,921,274 52 Bonds (\$26,881 per mile).....3,400,500 00 Notes payable.....152,009 08 Ledger balances.....21,019 53 Suspense.....\$272,585 82 Profit and loss.....1,096,863 81

Total (\$94,928 per mile).....\$11,694,531 50

The bills payable were reduced during the year by \$221,650.31. The valuation of the equipment as carried on the books has been reduced during the year to correspond with its present market value.

The work done during the year was as follows:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Train mileage.....	1,645,632	1,576,575	Inc..	4.4
Passengers carried.....	5,086,819	4,906,779	Inc..	3.7
Passenger mileage.....	67,897,723	65,423,454	Inc..	3.8
Tons freight carried.....	701,945	547,374	Inc..	8.4
Tonnage mileage.....	30,421,902	25,410,756	Inc..	19.7

The earnings from this business were as follows:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Passengers.....	\$1,354,202 37	\$1,371,978 67	Dec..	1.3
Freight.....	842,779 65	800,690 59	Inc..	5.1
Mail and express.....	81,475 83	81,088 31	Inc..	0.5
Rents.....	49,335 52	51,812 45	Dec..	4.9
Interest and premium.....	42,826 46	74,280 37	Dec..	41.3

Total.....

Expenses.....

Taxes.....

Total.....

Net earnings.....

Gross earnings per mile.....

Net earnings per mile.....

Per cent. of expenses.....

Per cent. of expenses and taxes.....

Included in expenses are rentals amounting to \$87,200 in 1876 and \$52,575 in 1875, the increase coming principally from the Lowell & Andover lease. The results of the year were as follows:

Net earnings.....

Interest and coupons paid.....

Dividends, 6 per cent.....

Surplus for the year.....

Profit and loss account has been credited with this surplus and charged with \$222,548.72, reduction in value of equipment; suspense account has been charged with \$9,940.25, charged off for bad accounts. Reference is made in the report

to the new system of accounts prescribed by the Massachusetts Railroad Commission, which is similar to that in use by the company for 15 years past. It is regarded as very satisfactory, and the uniformity of accounts is also considered valuable.

During the year, 2.86 miles of track have been relaid with iron and 6.59 miles with steel rails; considerable additions have been made to the sidings. The new passenger house at Melrose has been completed; that at Wakefield rebuilt; a restaurant at Portland, a passenger house at Pine Point, a freight house at Atkinson and a coal shed at Boston built. A tract on the Shawheen River in the town of Andover has been bought and fitted up as a picnic grove.

Authority has been obtained from the Legislature to consolidate with the company the Newburyport and the Danvers railroad companies, in both of which the Boston & Maine owns a controlling interest. The consolidation, which will soon be carried out, will save the expense of a separate organization and the trouble of keeping separate accounts and making returns.

On Jan. 15, 1876, a general reduction of 10 per cent. in wages was made, and the number of employees was also reduced. No addition to equipment was made during the year, except one passenger car.

The report says: "While there has been quite an increase in the volume of business during the year, over that of the year previous, in both passengers and freight, the gross receipts are a little less than for the year ending Sept. 30, 1875. This is accounted for, partly by the fact that our local business, on which we depend largely for our receipts, has been somewhat reduced by the general depression in business, and partly by the reduced rates received from through freight from the West, large quantities of which, since March last, have been carried over our road. This reduction in rates is the result of the competition that exists between lines running West from Boston.

"Little or no improvement in the business of the country has yet been felt by your road. Until there is a decided change for the better, until the factories and workshops located on your line of road, upon which your business greatly depends, shall become prosperous as in former years, you cannot expect increased returns for your investment."

"With the prosperity or adversity of the manufacturing establishments located all along the line of your road your corporation deeply sympathizes. If they are actively employed and prosperous, your corporation correspondingly prospers. It has ever been the policy of the managers of this road to do all in their power to encourage the introduction of new and various branches of industry on its line, believing that the net revenue of a railroad located like your own is derived mainly from its local business, and to that you must look in the future for the principal portion of your net earnings."

"Nothing within the knowledge of your directors has occurred since our last annual report to impair confidence in the real and permanent value of your investment. We look with entire confidence for better times from the revival of trade, which must come by reason of the actual wants and necessities of the country in the not very distant future."

Richmond, Fredericksburg & Potomac.

This company owns a line from Richmond, Va., northward to Quantico, 86 miles.

For the year ending Sept. 30 the earnings and expenses were as follows:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
From transportation.....	\$322,365 77	\$370,546 59	Dec..	4.9
Other sources.....	15,603 87	11,751 55	Inc..	32.6
Total.....	\$337,969 64	\$382,298 14	Dec..	3.7
Working expenses.....	177,793 65	180,049 38	Dec..	1.35
Net earnings.....	\$160,175 99	\$202,248 76	Dec..	21.0
Gross earnings per mile.....	4,278 72	4,445 33	Dec..	3.7
Net earnings per mile.....	2,311 35	2,351 73	Dec..	1.6
Per cent. of expenses.....	48.32	47.10	Inc..	2.6

President Robinson's report says: "In addition to the expenses of transportation above reported, during the year there has been expended in necessary additions to the works at Boulton the sum of \$3,190.67.

"The bonded and floating debt of the company has been reduced by the sum of \$20,641.

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works for erecting the channel span of the bridge over the Ohio River when, on Dec. 11, the ice in the river broke and carried the whole structure away. All the iron had been previously removed, however, and the crib and most of the timber grounded about four miles below the bridge and were saved and transported back, so that the loss will probably not exceed two or three thousand dollars.

Toledo, Wabash & Western.

The holders of the equipment bonds have begun suit in the New York Supreme Court to compel the company and the purchasers of the road to recognize their right to receive consolidated bonds in exchange for the equipment bonds which they now have. The case was to be heard Dec. 20.

Long Island.

This company has made a general reduction in passenger fares from New York to stations on its own line and to most of those on its leased lines.

St. Louis, Iron Mountain & Southern.

The Rogers Locomotive Works is suing this company in the New York Supreme Court to recover \$47,250, depreciation in value of nine locomotives built for the road and not taken by the company. It is claimed that the company is responsible for the difference between the contract price and that at which the engines were finally sold. The defence is that the engines were not ordered by the present company, but by the Cairo & Fulton prior to the consolidation.

Philadelphia & Reading.

The Philadelphia Ledger states that this company has made an arrangement with the Pennsylvania to haul coal for it from Richmond Junction in Philadelphia to South Amboy while the approach to the Port Richmond wharves is obstructed by ice. All the Reading's coal intended for the New York market will be sent this way during the winter.

Grand Trunk.

A telegram from Montreal says that General Manager Hickson has issued a circular stating that, in consequence of diminished business, a reduction of about 20 per cent. in freight train service will be made Dec. 23, with a corresponding reduction in the number of train employees.

Ohio & Mississippi.

Mr. Daniel Torrance, late President and now Receiver, has issued the following circular to the bond and stockholders:

"It is, I think, proper for me, as late President of your company, to state what in my judgment are the causes of the recent financial collapse of the company.

"They date long back. Two grave errors were made some years since, from which the company has never recovered, and which, attended and supplemented by constantly decreasing and unprofitable rates of competitive traffic, have finally brought the company down. These two errors were the construction of the Louisville Branch and the change of gauge. The branch has come far short of expectation—if indeed it ever earned interest, charges and expenses; and the change of gauge, while a seeming necessity, did not increase the earnings of the road. Meantime the funded debt of the company was nearly doubled.

"It has been shown in the annual reports of the company, and lately in that of the fiscal year ended 30th June last, that the company was carrying a large and increased floating debt. Nevertheless, up to that time and 1st July following, the interest and sinking-fund obligations of the company were regularly paid at maturity. Thereafter ensued a large falling off in net earnings, although tonnage hauled largely increased, and in the four following months ending Oct. 31 the average monthly net earnings decreased nearly 50 per cent. compared with the average of the preceding six months. This frightful sudden decline, the injured credit of the company, and the pressure of heavy call loans, forced the management, after due and serious consideration, to co-operate with certain mortgage bondholders—whose coupons lay over unpaid—and other creditors of the company, and obtain through the Courts the appointment of Receivers of the properties of the company, for the safety of all interests involved.

"The properties are now under the protection of the Court, and it is believed that the breathing spell afforded by that protection will enable the company to recover itself and satisfy all just claims at no distant date.

"The Committee of Safety, appointed at a meeting of bondholders in New York, has issued a circular setting forth the appointment of Receivers and the circumstances attending it. The committee charge that the statements of the last report of the company as to the condition of its affairs were untrue and that the road in very bad condition. They state also that they are informed that the January coupons on the first-mortgage bonds will not be paid. They regard the present position of affairs as very unsatisfactory and urge bondholders to join in a petition for the removal of the present Receivers and the appointment of a suitable person in their place. Mr. W. D. Griswold, of St. Louis, is mentioned as being a good man for the position.

"A meeting of the bondholders was held in Baltimore, Dec. 16, but was not largely attended and no action was taken.

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road and that the lease would expire Jan. 1, 1877. A proposition was received from the National Security Coal, Iron & Improvement Company, of Pittsburgh, to lease the road for 50 years at a fixed annual rental, and to complete the line from Staunton, Va., to Salem, taking pay for the work in bonds of the Valley Company at 86. Some modifications of this proposed lease were suggested but not agreed to, and it was postponed for the present. An offer of a new lease was then made by the Shenandoah Valley Company and rejected, and the board adjourned without deciding anything.

Iowa, Minnesota & North Pacific.

The Davenport (Ia.) Gazette says that the track is laid and trains are running on the section of this road from Monroe, Ia. on the Keokuk & Des Moines road, northward to Newton on the Chicago, Rock Island & Pacific. This section is about 13 miles long.

Keokuk & Des Moines.

In the division of the property of the old Des Moines Valley Company, the bridge over the Des Moines River at Des Moines went to the Des Moines & Fort Dodge Company. The Keokuk & Des Moines Company uses the bridge, and complains that it has not only been obliged to pay a heavy rent therefor, but that the bridge was not kept in proper repair. It proposes accordingly to build a new iron bridge for its own use, and also a new and convenient depot in Des Moines, and has asked the city for authority to make the necessary changes in its line through the city.

New Jersey Southern.

The suit for foreclosure of the first mortgage was before the Chancellor of New Jersey last week, when argument was heard on a number of intervening petitions. These include a claim of the State of New Jersey for unpaid taxes; one of A. P. Berthoud & Co. for \$50,000 for work and materials on the docks at Sandy Hook; one of the employees of the road, represented by trustees, for unpaid wages, and one of the Lehigh Car Manufacturing Company for cars furnished to the road.

Lake Superior & Mississippi.

In 1869 this company entered into a contract whereby it agreed to give the Erie & Western Transportation Company all its lake freights and passenger business for 20 years, in consideration of which that company established steamboat lines to Duluth and furnished facilities for doing the business. Subsequently Dr. J. H. Stewart, a stockholder, brought suit to have this contract declared invalid and set aside. The case has been tried several times, and last week the Minnesota Supreme Court gave a final decision sustaining the contract.

Brantford, Norfolk & Port Barwell.

This road, which was recently completed from Tilsonburg, Ont., to Brantford, 33 miles, is now worked by the Canada Southern under a temporary agreement. It is said that the Southern has offered to make a permanent lease, paying 20 per cent. of the gross earnings as rental, but the Grand Trunk has also made an offer to lease the road and both propositions are under consideration.

Hudson Tunnel Railroad.

After several days' session and hearing of argument and testimony, the commissioners have resolved to award the Delaware, Lackawanna & Western Company \$23,343, and the Jersey Shore Improvement Company \$3,993 for lands to be taken by this company. The Tunnel Company will appeal to the Court, holding the damages awarded to be excessive, as it claims that the building of the tunnel will not injure the lands on the surface.

Milton & Huron.

A section of this road is now completed from Milton, Ont., southeast to Bronte on the Toronto Branch of the Great Western. It is about 12 miles long.

International & Great Northern.

The Western Division was completed to the depot in Austin, Texas, Dec. 16, which is two miles beyond the late terminus at Austin Summit, and 178 miles southwest from the junction with the main line at Palestine.

Toledo, Wabash & Western.

In the suit brought by the Railroad Commission against this company in the Illinois Circuit Court at Jacksonville, for violation of the railroad law by discrimination and exorbitant rates, judgment was given against the road Dec. 17, the jury putting the damages at \$1,250. An appeal will be taken to the Supreme Court.

Meetings.

The following companies will hold meetings at the times and places given:

Philadelphia & Reading, annual, at the office, No. 227 South Fourth street, Philadelphia, Jan. 8, at noon.

Boston & Lowell, annual, at the passenger station on Causeway street, Boston, Jan. 3, at 10:30 a. m.

Connecticut River, annual, at the office in Springfield, Mass., Jan. 17, at noon.

Dividends.

Dividends have been declared by the following companies: Chicago, Rock Island & Pacific, 2 per cent., quarterly, payable Feb. 1.

Philadelphia, Wilmington & Baltimore, 4 per cent., semi-annual, payable Jan. 2.

Connecticut River, 4 per cent., semi-annual, payable Jan. 1.

Pennsylvania.

The Philadelphia Ledger says: "We understand that the Pennsylvania Railroad Company, in net cash receipts for the year 1876 (estimating the month of December), is at least one and a quarter million of dollars in excess of the net cash receipts in 1875. We see it stated that the officers of the company have been engaged since the close of the Centennial Exhibition in endeavoring to ascertain their business on the great six months' transportation campaign. It is estimated that the entire number of passengers carried during these six months exceeds 3,500,000, and to accommodate this multitude 22,542 trains, composed of 144,264 cars, were dispatched."

The Fast Mail Trains.

The new fast mail arrangements are made, not by running special trains as before, but simply by putting postal cars on the fastest and most convenient existing trains. From New York by the Pennsylvania, postal cars for St. Louis are attached to the express trains leaving at 8:30 a. m. and 6 p. m., and for Washington, to the newspaper train, which leaves at 4:30 a. m. With regard to the last-named train there appears to have been a misunderstanding, and the New York post office charges that an unnecessary delay is made between the time of receiving the mail and starting the train, and hints that this is done in order to keep the business of carrying the newspapers for the Adams Express Company, which has had it since the former fast mail was withdrawn. The arrangement will work more smoothly, however, after a short experience.

Detroit, Lansing & Lake Michigan.

This road was sold in Detroit, Mich., Dec. 14, under a decree of foreclosure and was bought by J. O. Shattuck and J. L. Stackpole, who represent the bondholders and who paid \$50,000 for the main line and \$10,000 for the Stanton Branch. The sale included the main line from Detroit to Howard, 164 miles, with branches from Kildville to Belden, 2 miles, and from Ionia to Stanton, 23 miles, and was made subject to the old

Ionia & Lansing first mortgage for \$770,000. The purchasers will at once organize a new company to be known as the Detroit, Lansing & Northern, which will issue new first mortgage bonds for one-half the amount of the old, preferred stock for the remaining half, and common stock for the accrued coupons and for the old second-mortgage bonds. Besides the \$770,000 Ionia & Lansing bonds which remain, there are about \$3,800,000 first-mortgage and \$1,400,000 second-mortgage bonds.

Cleveland & Southeastern Mineral.

A company proposes to construct a narrow-gauge railroad from Cleveland by the old canal bed southward to the vicinity of Weymouth, in Medina County, thence south in the valley of the Styx to its mouth at Milton; thence over level ground to the Kilbuck valley to Wooster and Millersburg, and thence to Coshocton and the Hocking valley. The line reaches the coal bed at Wadsworth, said to be the nearest coal to Cleveland, and it is recommended chiefly as a coal carrier. The company asks for subscriptions of the right of way and \$300,000 from the country along the line, for which it promises to complete the line to Coshocton next season.

Southern Railway & Steamship Association.

A meeting was held in Atlanta, Ga., Dec. 14, pursuant to adjournment, and continued on the following day. The committee on differences relating to balances due made a report, which was adopted, and the debtor companies agreed to pay as required by the report. It was voted that the association, which expires by limitation Dec. 31, should be continued for a year, until Dec. 31, 1877. The association adjourned until Feb. 1, when officers will be chosen.

Erie.

Receiver Jewett has received authority from the court to pay the back interest due on the fifth-mortgage bonds.

Auction Sales of Railroad Securities.

In New York, Oct. 20, at auction, New Haven & Derby first-mortgage bonds brought 104½; St. Louis & St. Joseph stock, 10; Toledo, Wabash & Western preferred stock, 4; common stock, 3½; Chicago, Danville & Vincennes, first-mortgage Illinois Division, 40; first-mortgage Indiana Division, 10 to 13; convertible bonds, 1 to 2; certificates of indebtedness, 30 to 67.

Cincinnati & Terre Haute.

The foreclosure sale of this road is announced to take place in Terre Haute, Ind., Jan. 31. Notice is also given that bondholders must present their claims for allowance to John D. Howland, Master appointed by the United States Circuit Court, at his office in Terre Haute, Ind., Jan. 23.

Lehigh Valley.

It is said that this company and the New Jersey Central are negotiating for a division of passenger business on their Pennsylvania lines, which are parallel and close together. Such an arrangement would admit of a great reduction in train service on both roads. It is said that the proposed arrangement includes the transfer of all the through New York passenger business to the Central at Easton.

Atlanta & Richmond Air Line.

The purchasing committee, which bought this road for account of the bondholders, is composed of Moses Taylor, B. R. McAlpin, A. P. Irvine, H. W. Sibley, L. Tuckerman, Eugene Kelly, Wm. H. Fogg, H. C. Hardy and Skipwith Wilmer. This committee represents \$4,178,000 out of \$4,248,000 first-mortgage bonds outstanding. It is proposed to organize a new company at once.

Chicago & Paducah.

Several English parties have lately been inspecting this road, and have, it is reported, agreed to advance the money required to build the proposed extension from Strawn to Chicago. This is not probable.

Atlantic & Pacific Telegraph.

This company, or parties in its interest, have organized a corporation in Indiana with a view to condemning the right of way for a telegraph line from Cincinnati to Louisville.

Union Pacific.

The Council Bluffs (Ia.) Nonpareil says that in consequence of the decision establishing Council Bluffs as the terminus of this road, the company has prepared plans for a large and convenient passenger depot to be built there. It is also proposed to build extensive stock yards and provide other terminal facilities.

Richmond, Fredericksburg & Potomac.

At the adjourned meeting in Richmond, Dec. 13, it was voted to adopt the annual report, with the suggestion that the board endeavor to arrange for a close connection and equitable rates with connecting lines both north and south; also that, to maintain the river connection between Quantico and Washington the company purchase a steamer to be run under its own control and management. The termination of the contract with the Potomac Steamboat Company was approved.

Richmond & Danville.

This company has recently fitted up its passenger equipment with the Westinghouse air brake.

Mount Airy.

This company has contracted with Maj. R. A. Atkinson to make a survey and location of its proposed line from Mount Airy, in Surry County, N. C., east by south to Greensboro, a distance of about 60 miles. It is to be a narrow-gauge road.

Cumberland Valley.

A vote is to be taken in Berkeley County, W. Va., on the question of subscribing \$75,000 in aid of an extension of this company's leased Martinsburg & Potomac road from Martinsburg to the Jefferson County line.

Columbus & Mineral Valley.

Bids for the construction of this road will be received until Jan. 10, 1877, and may be made for grading one or more sections or the whole road, or for the road complete, including track and buildings. Maps, profiles and estimates can be seen and all necessary information obtained at the office of John M. Pugh, President of the company, in Columbus, Ohio.

Duck River Valley.

The work of laying track on this road was begun at Columbia, Tenn., Dec. 12. It is intended to put down the rails to Lewisburg, 20 miles from Columbia. The road is of 3 ft. gauge.

Omaha & Republican Valley.

The grading of this road is now completed to Wahoo, Neb., 18 miles southward from the junction with the Union Pacific at Valley Station, and the track is laid for 10 miles of the distance. It is expected that trains will run to Wahoo this month.

Chicago, Burlington & Quincy.

At the special meeting held in Chicago Dec. 11, a majority of the stock was represented and voted to approve the action of the board in purchasing the St. Louis, Rock Island & Chicago Railroad.

New York Central & Hudson River.

The new grain elevator in New York is completed and ready for business. It is situated on the North River, at Sixtieth street; the building is of brick, 352 by 100 feet in size, has 296 bins with a storage capacity of 1,500,000 bushels, and can

handle 65,000 bushels per hour. It is built and equipped in a very complete manner and the motive power is furnished by an engine of 500 horse-power. The main driving belt, which was made by the New York Belting & Packing Company, is of rubber, 48 inches wide and 330 feet long. There is also a tower elevator on the river front for transferring grain from canal boats. The elevator will be managed by Mr. Whitney, of Rochester, as lessee.

Chicago & Southwestern.

In the United States Circuit Court at Chicago, Dec. 12, a bill was filed by E. M. Reynolds, of Iowa, and Peter C. A. M. Van Weel, of Holland, against Frederick Winston, J. W. Drury and George C. Campbell. The plaintiffs are holders of bonds secured by mortgage on the Atchison Branch of the Chicago & Southwestern, and the defendants are former officers of that company. The bill is very long, setting forth the history of the company, the construction of the road and the lease to the Rock Island Company, and claims that the plaintiffs' bonds have, by the foreclosure and sale of the main line, been deprived of all security. It is asked that the defendants be compelled to account for their expenditures in the construction of the road, and generally, that a full accounting and examination of the company's affairs may be had.

Brattleboro & Lake Champlain.

The surveys for this projected road are nearly completed, and the engineers say that they have found a line which will have no grades over 100 feet to the mile and will not be very expensive to build, with the exception of six miles out of White Hall, N. Y., the western terminus. The line follows West River from Brattleboro, Vt., to Winhall, and, passing the Green Mountain summit, runs down Pawlet River from Dorset to White Hall. A meeting to organize the company is to be called soon.

Pemberton & New York.

The Pennsylvania Railroad Company, which holds a considerable amount of the bonds of this company, as lessee of the United New Jersey roads, has made application to the Chancellor of New Jersey for a foreclosure and the appointment of a receiver, interest on the bonds being in default. The road is 18 miles long, from Whiting's, N. J., to Pemberton Junction, and was built in the interest of the New Jersey Southern, which guaranteed the bonds and has worked the road since its completion.

Manchester & Ashburnham.

At an adjourned meeting held in Manchester, N. H., Dec. 13, a number of delegates were present and liberal offers of assistance in the building of the road were made. It was resolved to organize the company at once, as the charter will expire Dec. 31, unless action is taken.

Washington City, Virginia Midland & Great Southern.

Notice is given that Mr. H. Shepperd, Special Master, under an order in the case of Graham against this company, in the Virginia Circuit Court, will proceed, at his office in Alexandria, Va., Jan. 3, to take account: 1. Of all liens against the property of said company created by mortgage, deed or judgment, and of interest due and unpaid on the same.

2. Of all debts not secured by lien, including especially wages due prior to June 1, 1876, and bills for supplies furnished prior to the same date.

All parties having claims against the company are required to present them at the time and place named above, with the evidence necessary to establish them.

Train Accidents in November.

On the morning of the 1st a passenger train on the Cairo & St. Louis road ran off the track near Red Bud, Ill., blocking the road some time.

On the afternoon of the 1st a passenger train on the South Shore Railroad ran over a misplaced switch and into the rear of a freight which was standing on a siding at East Braintree, Mass. The engine and several cars were damaged, a brakeman fatally and the fireman less severely hurt.

On the afternoon of the 1st there was a butting collision between a west-bound passenger and an east-bound freight train on the Union Pacific road, near Fremont, Neb. Both engines were badly broken and the passenger engine badly hurt.

On the night of the 1st, as an express train on the North Pennsylvania road, was passing Centre Valley, Pa., an axle broke under a passenger car and that car and three sleeping coaches were thrown from the track and badly broken. Two trainmen were killed and 12 passengers hurt, and the road was blocked several hours.

Early on the morning of the 2d the engine and several cars of a freight train on the Chicago, Rock Island & Pacific road were thrown from the track by a misplaced switch at Altoona, Ia. The engine upset and was badly damaged.

On the morning of the 2d a local passenger train on the Pennsylvania Railroad ran into two cars which had broken loose from a preceding freight train near Linden, N. J. The freight cars were wrecked, the engine thrown from the track and upset and a passenger car badly broken, blocking the track two hours. A driver in the caboose was killed, a tramp stealing a ride was buried under the wreck and badly hurt, the fireman and five passengers slightly injured.

On the evening of the 2d the engine and six cars of a freight train on the Connecticut Valley road were thrown from the track by a misplaced switch at Rocky Hill, Conn., blocking the road two hours.

On the night of the 2d, five cars of a freight train on the Chicago & Iowa road were thrown from the track at Daysville, Ill., blocking the road several hours.

Very early on the morning of the 3d, the engine of a freight train on the Baltimore & Ohio road ran off the track on a trestle bridge near Rosey's Rock, W. Va., and fell 40 feet to the ground and was completely wrecked. Four cars also left the track, three of them falling to the ground, while the fourth remained on the bridge. The engine and fireman were fatally and two others less severely hurt. The accident is thought to have been caused by the spreading of the rails.

On the 3d, a construction train on the Cincinnati Southern road ran off the track near Danville, Ky., damaging the engine and injuring the engine.

On the 3d, there was a rear collision between a Pittsburgh, Cincinnati & St. Louis and a Jeffersonville, Madison & Indianapolis switching train on the Union depot tracks in Indianapolis, by which two cars were wrecked.

On the 3d, a Kansas City, St. Joseph & Council Bluffs train backed into a Chicago & Northwestern freight train in the yard at Council Bluffs, Ia., damaging the Northwestern engine.

On the morning of the 4th, on the Louisville, Cincinnati & Lexington road, near Pewee Valley, Ky., there was a butting collision between an express train and a wild engine, by which both engines were wrecked and the baggage car damaged. Both engine men and one fireman were killed, the other fireman and an express messenger hurt. The wild engine should have waited at Pewee Valley, but the engine men misunderstood his orders and thought he could run to the next station.

On the morning of the 4th an express train on the Vermont & Canada road ran over a misplaced switch at East Swanton, Vt., and the engine and baggage car were thrown from the track and badly broken.

On the evening of the 4th an express train on the Pennsylvania Railroad struck the rear car of an excursion train which was left standing too close to the main track when the train went upon a siding at Elizabeth, N. J., for the express to pass. The car was badly damaged.

On the afternoon of the 4th, near Shoals, Ind., on the Ohio & Mississippi road, there was a butting collision between a passenger and a freight train by which both engines were damaged and an engine man and fireman killed.

On the night of the 4th a sleeping coach on the Memphis & Little Rock road ran off the track on a trestle near Edmondson, Ark., and fell to the ground, dragging another car after it. Both cars were piled up in a bad wreck, injuring two passengers so that they died in a short time and 17 others less severely. The accident was caused by the breaking down of a truck.

Early on the morning of the 5th, on the New Orleans, St. Louis & Chicago road, near West, Miss., there was a butting collision between a passenger and a freight train, by which both engines were wrecked.

Very early on the morning of the 5th a freight train on the Ohio & Mississippi road was thrown from the track near Montgomery, Ind., blocking the road five hours.

On the night of the 5th a freight train on the Ohio & Mississippi road struck a broken rail near Poston, Ind., and eleven cars were thrown from the track, some of them being damaged. The road was blocked several hours.

On the evening of the 6th, near Dover, N. C., on the Atlantic & North Carolina road, there was a butting collision between a passenger train and a wild engine, by which both engines were damaged, the passenger engine killed and both firemen hurt. It is said that the collision was the result of carelessness, the wild engine being on the passenger train's time, and neither engine having a head-light lighted, although it was dark at the time.

On the evening of the 6th an extra freight train on the Erie Railroad ran over an ox which had strayed upon the track near Summit, Pa., and the engine and ten cars were thrown from the tracks. The engine man was slightly hurt.

On the morning of the 7th the engine and several cars of an express train on the Cincinnati, Hamilton & Indianapolis road were thrown from the track at Brownsville, Ind., by a switch which had been purposely misplaced. The engine was badly broken, the engine man slightly and the fireman severely hurt.

On the 7th a freight train on the New York Central & Hudson River road was stopped suddenly to avoid a collision with a train which was standing on the track near Churchville, N. Y. A following freight ran into the rear of the first train, wrecking a number of cars and killing a brakeman.

On the night of the 7th the engine of a freight train on the Cleveland, Columbus, Cincinnati & Indianapolis road ran off the track at Brighton, O.

On the morning of the 8th a Burlington & Southwestern freight train ran off the track on the Chicago, Burlington & Quincy track, near Fort Madison, Ia. Two cars went into the ditch and were wrecked.

On the morning of the 8th a passenger train on the White-water Valley road ran into some freight cars which were standing on the Ohio & Mississippi track at the crossing of the two roads in Sedamsville, O. A freight car was wrecked and an engine damaged.

On the morning of the 8th a mixed train on the Frederick Railroad ran into a wash-out near Glasier's, N. B., and two cars were thrown into a ditch and wrecked.

On the 8th a train on the New Brunswick & Canada road ran into a wash-out near Watt Junction, N. B. The engine and tender were badly broken, and a snow-plow, which was attached to the rear of the train, ran into and wrecked the rear end of the last car.

On the 8th a freight train on the Baltimore & Ohio road ran into the rear of a preceding freight which had stopped near Woodbine, Md., the engine having broken down. An engine was badly damaged and a caboose wrecked and afterwards burned up.

On the 8th an express train on the Chicago, Rock Island & Pacific road ran into a drove of cattle near Joliet, Ill., and several cars were thrown from the track.

On the evening of the 8th a passenger train on the North Pennsylvania Railroad struck a horse which had strayed upon the track near Jenkintown, Pa. The engine was thrown from the track and rolled down a bank, breaking itself badly, killing the engine man and fireman.

On the night of the 8th a special train on the Jacksonville, Pensacola & Mobile road was thrown from the track by some obstruction put upon it near Tallahassee, Fla.

Very early on the morning of the 9th, as a passenger train on the Hannibal & St. Joseph road was passing over a switch at Yellow Creek bridge, near Brookfield, Mo., the switch rod broke and the four rear cars were thrown from the track and dragged over the ties to the bridge, when the first car broke loose and went down a bank 30 feet high, rolling over several times. The car was completely wrecked, the roof being torn off, and the other cars were upset. Twelve passengers were badly and 21 slightly hurt.

On the 9th a coal train on the Syracuse, Binghamton & New York road ran into the rear of a preceding coal train in Syracuse, N. Y., damaging the engine and wrecking ten coal cars.

On the evening of the 9th as a freight train on the New York Central & Hudson River was backing into the yard at Albany, N. Y., it struck a flat car which was standing on the track and several cars were badly damaged.

Early on the morning of the 10th a wild engine on the Boston & Albany road ran into the rear of a freight train near East Chatham, N. Y., wrecking the caboose and damaging three other cars.

On the morning of the 10th the engine of a train on the Erie Railroad was thrown from the track near Canisteo, N. Y., by a misplaced switch.

On the morning of the 10th the two rear cars of a freight train on the Rutland Railroad were thrown from the track near Brandon, Vt., by a broken rail. Both cars were thrown down the bank and somewhat damaged.

On the 10th three cars of a train on the Connecticut Valley road were thrown from the track near Rocky Hill, Conn., by the spreading of the rails.

On the night of the 10th as a work train on the New York Central & Hudson River road was backing upon a siding at Lockport, N. Y., the brakes failed to hold, and two cars went off the end of a siding, ran into a bank and were badly broken. A brakeman was hurt.

On the morning of the 11th a freight train on the New York & New England road was thrown from the track at Woonsocket, R. I., by a brake-beam falling on the track. Five cars went into the ditch and were badly broken.

On the 11th a mail train on the Seaboard & Roanoke road ran into the rear of a construction train near Suffolk, Va., wrecking the engine and several cars, injuring the engine man and three others.

On the 11th, near Boynton, Pa., on the Tyrone & Clearfield Branch of the Pennsylvania Railroad, there was a butting collision between a coal and a freight train, by which both engines and several cars were badly broken and four trainmen hurt.

On the evening of the 11th as a train on the Central Railroad of New Jersey was entering the depot at Jersey City, N. J., which is built partly upon a pier, it was found that the vacuum brakes were out of order and would not work, and the engineer was unable to stop the train, which ran off the end of the track across a paved space beyond, through the depot offices and into the Hudson River. The engine and tender went down into the water, the baggage car stood upon one end, which rested on the engine, and the smoking car was piled on the upper end of the baggage car, the engine and two cars being badly broken and the depot offices much damaged. The en-

gineer jumped and was badly hurt and two passengers were slightly injured.

Very early on the morning of the 12th a car in a freight train on the Mobile & Ohio road caught fire near Meridian, Miss., and four flat cars loaded with cotton were destroyed.

On the morning of the 12th an express train on the Lake Shore & Michigan Southern road ran into the rear of a ballast train near Englewood, Ill., damaging the engine, wrecking several ballast cars and injuring the engine man and fireman.

On the morning of the 13th a coal train on the Central Railroad of New Jersey was thrown from the track by a misplaced switch at Raritan, N. J. The engine was damaged and 20 coal cars wrecked.

On the night of the 13th the engine of a freight train on the Chicago, Burlington & Quincy road was thrown from the track in the yard at Aurora, Ill., by a switch which had been purposely misplaced.

Early on the morning of the 14th, as a freight train on the Philadelphia, Wilmington & Baltimore road was near Edgemoor, Del., an axle broke under a coal car and the eight following cars were piled up on it and badly broken, obstructing both tracks for some time.

Near noon on the 14th, as a freight train on the Carolina Central road was crossing a trestle bridge over Hitchcock's Creek, near Rockingham, N. C., the bridge gave way, and 11 cars went down into the creek and were badly wrecked.

On the 14th three cars of a passenger train on the New Orleans, St. Louis & Chicago road were thrown from the track near Canton, Miss.

On the afternoon of the 14th a local passenger train on the Pennsylvania Railroad ran into some cars which had broken loose from a preceding freight train near Menlo Park, N. J. The engine was damaged, the caboose wrecked, the conductor and a passenger injured. The operator at the last signal station had signalled the line clear, not knowing that the freight had left cars behind, and not waiting to see the caboose pass.

On the 15th a local train on the Pittsburgh, Cincinnati & St. Louis road ran into the rear of a construction train in the tunnel at Cork Run, Pa., damaging the engine, wrecking two coal cars, which were thrown over on the opposite track, and injuring three train men slightly.

A few minutes after a freight train came up on the opposite track and ran into the wrecked coal cars. Two of the freight cars were somewhat damaged. It is said that the local coal train had no right to the track at the time.

On the 15th as a train on the Pensacola & Louisville road was about 17 miles from Pensacola, Fla., the crown sheet of the fire-box gave way and the force of the explosion lifted the engine from the track and threw it over on its side. The engine was badly damaged, the engine man, fireman and another badly scalded and the conductor slightly hurt.

On the 15th, the engine of a train on the Missouri River, Fort Scott & Gulf road was thrown from the track by a misplaced switch near Kansas City, Mo., and upset, injuring the engine man.

Late on the night of the 16th a freight train on the Chicago & Iowa road ran off the track near Hinckley, Ill., and five cars were upset and badly broken, blocking the track six hours.

On the morning of the 17th an express train on the St. Louis, Iron Mountain & Southern road struck a broken rail near Malvern, Ark., and three cars were thrown from the track and down a low bank. The cars were badly broken and some 20 passengers were bruised and slightly hurt.

On the afternoon of the 17th a long freight train on the Boston & Maine road, drawn by two engines, ran over a misplaced switch and into some cars which were standing on a siding at Ballardvale, Mass. Both engines and 15 cars were wrecked, the engine man and fireman of the second engine killed and three brakemen hurt. The wreck caught fire, but was put out after two cars had been burned up.

On the night of the 17th an express train on the Ohio & Mississippi road ran over a misplaced switch and into the rear of a freight train which was standing on a siding at Sparkville, Ind. The engine of the express and the caboose and several cars of the freight were wrecked and two brakemen killed.

On the morning of the 18th a passenger train on the Southwestern Division of the Chicago, Rock Island & Pacific road ran into the rear of a freight train which was standing on the main track at Beverly, Mo., damaging two cars.

On the morning of the 18th as a local freight train on the Pennsylvania Railroad was trying to send some cars on a siding at the Wilmington & Reading crossing at Coatesville, Pa., the detached cars struck the tender, damaging it badly and injuring a brakeman.

On the morning of the 18th a train on the Cairo & St. Louis road was thrown from the track by a misplaced switch near East St. Louis, Ill. The engine man was new to the road and did not know that he should have stopped before running over the switch at that point.

On the 18th there was a collision between two freight trains on the Newburgh Branch of the Erie Railroad by which several cars were wrecked.

On the night of the 19th a passenger train on the Atlanta & Richmond Air Line ran off the track near Charlotte, N. C.

On the morning of the 20th two cars of a freight train on the Cincinnati, Hamilton & Dayton road were thrown from the track by a brake beam which fell upon the rails. The track was blocked for an hour.

On the 20th a freight train on the New York Central & Hudson River broke in two near Fairport, N. Y., and the rear section afterwards ran into the forward one, wrecking several cars.

On the 20th a mixed train on the Alabama & Chattanooga road was thrown from the track by the spreading of the rails near Wildwood, Ala. Two cars were wrecked and the conductor was hurt.

On the evening of the 20th an express train on the Canada Southern road ran into the rear of a freight train which had stopped at Grand Trunk Junction, near Detroit, Mich., wrecking several cars, damaging the engine, injuring the engine man severely and the fireman slightly. The freight conductor had sent back a signal which the passenger engine man failed to see.

On the evening of the 20th a passenger train on the Cairo & St. Louis ran over a misplaced switch and into some cars that were standing on a siding at Hodges' Park, near Cairo, Ill. The engine and several cars were damaged. The switch is thought to have been purposely misplaced.

Early on the morning of the 21st three cars of a freight train on the Grand Trunk Railway ran off the track near Napanee, Ont., and after running across a bridge on the ties, turned and went down a high bank and were completely wrecked.

Early on the morning of the 21st a freight train on the Central Pacific road broke in two near Gold Run, Cal., and the rear section afterwards ran into the forward one, wrecking several cars and blocking the track five hours.

On the afternoon of the 21st, as a freight train on the New York Central & Hudson River road was passing through the yard at East Rochester, N. Y., an axle broke under a freight car and several cars were thrown from the track.

Near midnight on the 21st five cars of a Toledo, Wabash & Western stock train were thrown from the track by a broken frog in the Chicago, Burlington & Quincy track, near Camp Point, Ill. The road was blocked 2½ hours.

On the night of the 22d the engine and baggage car of a passenger train on the Indianapolis & Vincennes road were thrown from the track near Worthington, Ind., by the breaking of a wheel.

Near midnight on the 22d, as a passenger train on the Indianapolis, Cincinnati & Lafayette road was approaching the

Union depot in Indianapolis, a switching engine tried to run across the track on a cross-switch and struck the rear car of the passenger. Both car and switching engine were badly damaged.

On the afternoon of the 23d a train on the Oregon & California road ran off the track near Salem, Oregon, delaying the train some hours.

On the morning of the 24th, in a heavy snow storm, a freight train on the New York Central & Hudson River road broke in two at Green's Corners, Rome, N. Y. Another freight was following close behind, the engine of which saw the cars dropped by the preceding train and stopped just in time to avoid them. His own train, had, however, broken in two and as he stopped the detached cars struck the train in the rear and forced it forward against the other train, wrecking several cars, damaging the engine and blocking the road some time.

On the 24th five cars of a ballast train on the Intercolonial Railway ran off the track near Shubencade, N. S., and were badly broken.

On the night of the 24th on the Chicago, Burlington & Quincy road, near Ottumwa, Ia., there was a butting collision between two freight trains, by which both engines and several cars were damaged. The accident is said to have been the fault of the conductor of the west-bound train, as the east-bound train had the right to the track.

Early on the morning of the 25th the engine and 11 cars of a freight train on the New York Central & Hudson River road were thrown from the track near Castleton, N. Y., by a horse which had strayed on the track and had been caught fast in a bridge. The engine upset in the mud and the track was blocked seven hours.

On the 25th a construction train on the Chicago & Lake Huron road ran into some stones which had fallen on the track near Beloit, Mich., and the caboose car was thrown from the track, killing one man and injuring another.

On the morning of the 26th, on the Pennsylvania Railroad, at Trenton, N. J., there was a collision between a coal and a freight train by which several cars were wrecked.

Early on the morning of the 26th the baggage car of an express train on the Baltimore & Potomac road caught fire when the train was near Patuxent, Md., and was entirely destroyed, with most of its contents, including a trunk full of jewelry valued at \$20,000. The fire is thought to have started from the stove.

On the night of the 27th the engine and baggage car of an express train on the New Orleans, St. Louis & Chicago road were thrown from the track by a pile of ties on the rails near Bolivar, Tenn. The same train had encountered three similar obstacles within a short distance. The fireman was fatally and the engine man slightly hurt.

Late on the night of the 27th a passenger train on the Cleveland, Columbus, Cincinnati & Indianapolis road was thrown from the track by a misplaced switch near Dayton, O. The engine went down a bank and was badly broken, scalding the engine man slightly.

Very early on the morning of the 28th a car of a freight train on the Pennsylvania Railroad ran off the track at Snag Hollow, Pa., causing some delay of trains.

Early on the morning of the 28th as a freight train on the South Carolina Railroad was going up a grade near Aiken, S. C., with a pusher on the rear end, the train broke in two and the pusher afterwards drove the rear section into the forward one, damaging several cars.

On the morning of the 28th a car of a freight train on the Indianapolis & St. Louis road ran off the track at the Toledo, Wash & Western crossing in Litchfield, Ill., blocking both roads for several hours.

On the 28th as a train on the Sandersville & Tennille road was approaching Sandersville, Ga., the engine man, for some reason, was unable to stop his engine and it ran off the end of the track and into a bank.

On the afternoon of the 28th as a local passenger train on the Intercolonial road was near Truro, N. S., a driving wheel broke, delaying the train some time.

On the evening of the 28th a train on the Intercolonial road struck a misplaced switch in Halifax, N. S., and was thrown from the track, blocking the road two hours.

Early on the morning of the 29th, on the St. Louis, Kansas City & Northern road, near Huntville, Mo., there was a collision between an extra freight and a construction train, by which some damage was done and the freight engine man killed.

On the night of the 29th the engine of an express train on the Delaware, Lackawanna & Western road was thrown from the track by a pile of ties which had been put upon the rails near Clark's Summit, Pa.

On the night of the 30th the baggage car of an express train on the Erie Railway caught fire when the train was near Corning, N. Y. The car was destroyed, with a part of the baggage.

This is a total of 96 accidents, whereby 23 persons were killed and 135 injured. Fourteen accidents caused death, 20 injury but not death, while 62, or 64.6 per cent. of the whole number caused no injury serious enough for record.

These accidents may be classified as to their nature and then as follows:

COLLISIONS:
Rear collisions 24
Butting collisions 7
Crossing collisions 3
Unexplained 2

DERAILMENTS:
Unexplained 14
Misplaced switch 12
Cattle on track 4
Spreading of rails 4
Broken axle 3
Broken rail 3
Malicious obstruction 3
Accidental obstruction 3
Running off end of siding 3
Wash-out 2
Broken truck 1
Broken switch rod 1
Broken frog 1
Broken wheel 1
Broken bridge 1

Cars burned while running:
Boiler exploded 1
Broken wheel, not causing derailment 1

Total: 96

Six collisions were caused by trains breaking in two, four by failure to give or receive orders correctly, three by misplaced switches, two by failure to use signals, and one each by carelessness in putting cars on a siding and by a flying switch. Three switches are said to have been purposely misplaced. The broken bridge recorded was an ordinary wooden trestle bridge. There were 24 accidents resulting directly from defect or failure of road or equipment. One case is said to have resulted from a failure of brakes to work when applied.

As compared with November, 1875, there is an increase of nine accidents, a decrease of one in the number killed and an increase of 38 in that injured.

Three malicious obstructions and three purposely misplaced switches make the considerable number of six cases of train.

wrecking. Twelve accidents, three collisions and nine derailments, caused by switches carelessly left open make a very unpleasant record, and indicate room for improvement in discipline. Butting collisions are fewer in number than in October, but there are a great many rear collisions, one-fourth of the whole number of accidents, and it must be admitted that this is an indication of too great carelessness in the handling of trains, and probably also in the use of signals. The number of persons injured is unusually large.

For the year ending with November the record is as follows:

	No. of accidents.	Killed.	Injured.
December.....	84	12	62
January.....	60	8	29
February.....	91	15	68
March.....	109	30	96
April.....	66	6	47
May.....	64	13	116
June.....	52	19	73
July.....	79	17	69
August.....	78	22	76
September.....	106	41	133
October.....	103	40	115
November.....	96	23	135
Totals.....	978	246	1,018

The averages per day for the month were 3.20 accidents, 0.77 killed and 4.50 injured; for the year they were 2.67 accidents, 0.67 killed and 2.78 injured. The daily averages for the month were thus all considerably above those for the year. The average casualties per accident were for the month 0.240 killed and 1.406 injured; for the year 0.252 killed and 1.041 injured.

The Crewe Railway Colony.

An English paper has the following:
"On Tuesday night the prizes gained by the students of the Crewe Mechanics' Institute, including ninety-five prizes and 201 certificates given by the Science and Art Department, were distributed by Mr. Hick, M. P., one of the directors of the London & Northwestern Railway Company, Mr. F. W. Webb, the Chief Mechanical Engineer and Locomotive Superintendent of the company, being in the chair. The town of Crewe is perhaps the most remarkable of the workmen's cities which owe their modern development to the fact that a great railway company found the site neglected and tempting for the establishment of work-shops. Forty years ago there was but one farmhouse on the site of Crewe, and in the whole township there were in 1841 203 inhabitants. In 1843 shops for repairing locomotive engines, carriages and wagons, were erected at Crewe by the Grand Junction Railway, whose lines have since become part of the Northwestern system. In 1851 the population had risen to 4,571. In 1861 it was 8,159. Crewe now reckons 24,000 inhabitants, and the population of the neighboring villages has largely increased. A town's meeting has been held, and a resolution passed in favor of incorporation under the Municipalities Act, but the result of the Government inquiry held in consequence by Major Donnelly has not yet been published. The railway works occupy twenty-seven acres under cover and eighty-five acres in all. The London & North-

western Railway Company make the gas for the town, bring the water from the red sandstone twelve miles south of Crewe, and have established baths and wash-houses. The railway company have also built a church and subscribed to the erection of several chapels. The company have constructed several hundreds of dwellings for workmen, some in blocks of four standing in a garden, and others more recently in rows. These cottages are let at weekly rents, ranging between 3s. and 4s. 6d. With the help of building societies some hundreds of other houses have become the freehold property of workmen. No public-houses are erected on the company's land. Very recently some fustian factories have been opened, but the London & Northwestern Railway Company are still beyond comparison the principal employers of labor. Between 5,000 and 6,000 men and boys are engaged in their shops. Some hundreds more find occupation in the steam-sheds, permanent way departments and the goods and shunting yard of Crewe Junction. A savings bank has been instituted by the railway company, which pays interest at 4 per cent. per annum on sums below £50, and invests larger amounts for the workmen in the debentures of the company. Just before the £50 limit was adopted, in the middle of the present year, the amount in the savings bank was stated to be close upon £100,000, although a period of unusual depression in trade had already set in, which has reduced the working days at the shops to five in a week.

The workmen's children are taught in three great national schools built by the company. Sons of workmen have the right to enter the company's employment as apprentices, a privilege for which others pay £50 when the supply of workmen's sons leaves vacancies. The premium of £50 is divided between the Mechanics' Institute and other institutions for the benefit of workmen. There are at present 700 apprentices in all.

The Mechanics' Institute has been provided by the company. It has a library of upwards of 5,000 volumes, many of which are works on scientific subjects. It has a reading room supplied with papers and telegrams, a chess-room, a smoking room, a gymnasium, an American bowling-alley, a large lecture-room, and a reference-room, in which the specifications of all patents relating to mechanical inventions are preserved. Other rooms are devoted to evening classes held during the winter months by teachers having the certificates of the Science and Art Department or other departments. The number of members of the institution is between 1,100 and 1,200. The attendance on the classes in the present session is 1,011. Many students join several classes. That class which has the largest number of students—the arithmetic and mensuration lecture—counts 265. There are 13 classes taught by ten teachers. The subjects studied are, in addition to arithmetic and mensuration, grammar and geography, 176 students; drawing, two classes, 128 students; sewing, 106 students; magnetism and electricity, 90; acoustics, 108 and steam, 90; mathematics, 46; chemistry, 42; mechanics and heat, 34; Scripture, 14; animal physiology, 13; English history, 7. The preferences evidenced by these numbers are characteristic. The classes have had in some respects a remarkable success. Pupils of the Crewe Mechanics' Institute have risen to posts of great emolument and importance in the engineering profession. Five of them have gained Whitworth scholarships, seven are at present, with the aid of exhibitions which they have gained, pursuing their studies at Owens' College, Manchester, at the Royal College of Science, Dublin, and at South Kensington.

LOCOMOTIVE RETURNS, SEPTEMBER, 1876.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

NAME OF ROAD.	Number of miles operated.	Number of Locomotives in service.	Mileage.		No. Miles run to Ton of Coal.	Cost per Mile in Cents for							Av. cost of Coal per ton or bushel.	Wood per cord.	
			Total.	Average per Engine.		Repairs.	Fuel.	Stores.	Miscellaneous.	Engines, Steamers, and whips.	Total.				
Atlantic & Great West'n (1st & 2d Div.)	228	92	224,007	2,752	42.95	16.68	3.37	4.88	0.51	0.63	6.32	15.71	1.97	3.15	
" " (Third & Fourth Div.)	197	48	113,042	2,355	42.95	19.88	4.28	4.88	0.42	0.75	5.91	16.24	1.97	3.15	
" " (Mahoning Division)	88	55	117,624	2,139	42.95	21.79	3.64	4.88	0.40	0.49	5.85	15.26	1.97	3.15	
Cairo & Vincennes	157	11	21,508	1,955	47.40	15.80	4.49	3.25	0.39	0.39	6.55	14.68	1.50	1.00	
California Pacific	148	18	46,064	2,559	36.78	50.11	8.44	20.48	0.66	0.51	7.37	37.46	8.00	5.00	
Camden & Atlantic	67	13	26,214	2,017	64.90	15.00	0.51	7.49	0.81	0.43	5.48	14.24	4.79	6.00	
Central Pacific (Western Division)*	178	52	134,756	2,591	36.32	17.46	4.40	20.00	0.77	0.43	7.64	34.36	7.25	5.00	
" " (Visalia Division)*	157	11	34,114	3,101	58.93	21.65	10.29	12.35	0.50	0.26	7.47	31.57	7.25	5.00	
" " (Tulare Division)*	131	13	30,124	2,317	35.71	12.26	5.99	30.34	1.11	0.50	8.01	35.95	7.25	5.00	
" " (Los Angeles, Yuma, San Diego and Wilcox Divs.)	278	15	40,578	2,705	66.20	14.33	2.96	10.99	0.91	1.26	7.71	23.83	7.25	5.00	
" " (Sacramento Division)*	120	44	117,662	2,674	38.12	15.19	7.98	17.76	0.78	0.36	9.08	36.03	5.00	5.00	
" " (Oregon Division)*	151	7	20,992	2,999	39.16	20.28	13.61	12.77	0.66	0.37	8.80	36.21	5.00	5.00	
" " (Truckee Division)*	205	26	72,528	2,690	36.20	27.12	9.23	19.33	0.82	0.39	8.24	38.01	7.25	5.00	
" " (Humboldt Division)*	237	24	70,781	2,949	38.39	15.82	9.41	18.92	0.78	0.36	7.77	37.24	7.25	5.00	
" " (Salt Lake Division)*	183	27	72,580	2,688	36.40	14.24	8.00	19.95	0.92	0.36	7.70	36.93	7.25	5.00	
Cleve., Col., Cin. & Ind. (Col'bus Div.)	138	69	170,362	2,887	42.25	80.00	2.56	4.63	0.47	0.98	5.48	14.12	1.75	3.50	
" " (Indianapolis Div.)	207	66	219,530	3,326	44.64	37.36	3.11	4.65	0.69	1.35	5.56	15.26	1.75	3.50	
" " (Cincinnati Div.)	130	29	84,838	2,925	37.69	23.90	2.55	5.01	0.50	0.90	5.86	14.92	1.75	3.50	
Cleveland & Pittsburgh	199	75	163,670	2,181	52.49	20.40	2.69	3.13	0.54	2.38	6.90	15.63	1.28	2.05	
Cleveland & Mahoning Valley	41	6	14,793	2,466	40.19	20.95	0.66	5.02	0.33	1.16	6.20	13.36	1.81	2.81	
Del., Lacka. & West. (Bloomsburg Div.)	80	27	71,050	2,631	38.12	15.19	1.82	10.77	0.73	0.93	5.58	13.43	1.77	1.77	
Erie & Pittsburgh	98	28	48,267	1,724	38.12	16.11	2.66	4.65	0.67	1.69	6.91	16.71	1.77	1.77	
Hannibal & St. Joseph	206	60	146,269	2,438	38.60	22.40	4.70	4.00	0.30	0.30	6.90	15.90	1.50	2.50	
Illinois Central (Chicago Div.)	253	65	156,602	2,409	39.25	16.36	3.78	4.75	0.26	0.26	6.24	15.03	1.75	4.00	
" " (South Div.)	231	30	67,510	2,260	46.55	16.25	7.08	4.05	0.27	0.27	6.00	17.40	1.75	4.00	
" " (North Div.)	225	43	85,118	1,979	34.08	13.96	9.92	5.46	0.32	0.32	6.56	22.26	1.75	4.00	
" " (Iowa Div.)	401	46	96,463	2,099	39.58	18.81	6.45	7.92	0.28	0.28	6.32	20.94	3.00	5.12	
Jeffersonville, Madison & Indianapolis	226	42	91,868	2,187	40.10	26.67	2.85	6.28	0.62	2.18	6.43	17.96	2.80	2.25	
Kansas Pacific, Main Line	673	85	157,373	1,851	32.24	14.19	4.90	9.48	0.41	0.41	6.91	21.70	3.00	3.60	
" " Including all branches	915	94	189,150	1,916	32.45	14.26	4.71	9.58	0.40	0.40	7.14	21.83	3.05	3.75	
Kansas City, St. Jo. & Council Bluffs	275	27	73,635	2,727	54.60	22.40	6.10	6.00	0.40	0.40	6.60	19.10	3.00	3.00	
Lake Shore & Mich. So. (Buff. Div.)**	90	187,922	2,088	38.04	45.19	17.90	4.79	10.71	0.56	0.56	6.22	22.30	4.00	5.69	
" " (Erie Div.)**	113	243,305	1,153	39.19	50.12	17.90	3.82	8.65	0.38	0.38	5.79	18.63	3.25	5.43	
" " (Toledo Div.)**	85	176,642	2,078	35.51	49.09	17.90	3.02	9.61	0.44	0.44	5.77	18.88	3.45	4.08	
" " (Mich. So. Div.)**	207	443,089	2,140	34.85	55.93	17.90	4.10	9.97	0.30	0.30	6.20	21.99	4.25	4.43	
Leavenworth, Lawrence & Galveston	204	18	24,667	1,370	48.70	28.90	7.98	7.37	0.29	0.29	6.71	21.71	3.44	2.80	
Little Rock & Fort Smith	158	15	15,848	1,056	216.67	53.68	4.48	3.53	0.82	0.82	5.51	14.14	3.00	2.00	
Marquette, Houghton & Ontonagon	88	26	41,180	1,594	45.99	28.40	2.06	11.55	0.83	0.83	7.07	21.23	3.00	2.00	
Missouri, Kansas & Texas**	786	65	215,615	3,364	34.48	7.82	4.52	7.01	0.51	0.51	6.18	18.32	2.25	2.25	
North'n Cent'l (Erie & Conand'gus Div.)	147	47	112,070	2,384	36.78	26.83	5.94	5.64	0.89	0.89	6.06	18.22	0.07	2.73	
Pennsylvania (New York Division)††	120	132	356,551	2,701	34.77	10.20	4.20	11.90	1.20	1.20	11.90	17.30	0.144	6.24	
" " (Amboy Division)††	154	47	84,338	1,792	56.38	15.20	3.40	7.60	0.90	0.90	7.30	19.04	0.08	4.00	
" " (Belvidere Division)††	103	35	71,917	2,055	41.13	10.75	5.00	10.00	1.20	1.20	16.80	14.44	0.144	6.24	
" " (Philadelphia Division)††	191	197	526,385	2,672	39.67	13.59	1.00	4.90	0.80	0.80	7.30	19.04	0.08	4.00	
" " (Middle Division)††	132	101	337,284	3,339	39.23	18.25	4.90	4.90	0.70	0.70	10.50	10.08	0.048	4.00	
" " (Pittsburgh Div. E. End)††	107	77	163,361	2,109	33.44	10.20	3.70	6.10	1.00	1.00	10.80	10.08	0.048	4.00	
" " (Pittsburgh Div. West End)††	124	134	355,175	2,703	33.89	13.93	2.60	4.20	0.70	0.70	7.50	10.08	0.048	4.00	
" " (Tyrona Division)††	107	28	55,248	1,973	29.30	24.51	3.40	5.00	0.60	0.60	11.00	10.08	0.048	4.00	
" " (West Pennsylvania Div.)††	104	26	50,730	2,029	49.67	31.05	3.10	3.70	0.40	0.40	7.20	10.08	0.048	4.00	
" " (Lewistown Division)††	66	6	12,894	2,149	38.42	18.38	3.00	3.30	0.60	0.60	7.30	10.08	0.048	3.96	
" " (Bedford Division)††	57	4	8,637	2,159	39.02	28.69	7.40	4.80	0.40	0.40	12.60	10.08	0.048	4.00	
Pitts., Ft. Wayne & Chi. (East'n Div.)†	371	153	400,414	2,617	41.96	16.56	15.30	10.66	2.80	3.98	0.73	16.64	16.65	1.63	1.63
" " (Western Div.)†	320	113	310,099	2,144	36.39	17.30	2.75	5.06	0.45	1.93	6.40	16.64	1.96	1.96	
Pitts., Cin. & St. L. (Little Miami Div.)†	197	40	97,086	2,437	45.92	13.12	4.86	4.80	0.67	2.14	9.99	15.96	2.10	2.50	
" " (Pitts. & Col. Div.)†	224	—	—	—	—	—	—	—	—	—	—	—	—	—	
St. Louis, I. M. & So. (Arkansas Div.)	323	32	80,580	2,518	—	39.70	3.25	5.94	0.59	0.59	6.98	16.76	—	2.80	
Stockton & Copperopolis	40	2	3,952	1,976	—	76.37	14.07	5.64	0.52	0.89	9.30	31.32	—	5.00	
West Jersey†††	128	18	40,703	2,261	43.75	36.91	12.30	7.70	0.50	0.50	22.50	14.44	4.44	4.44	